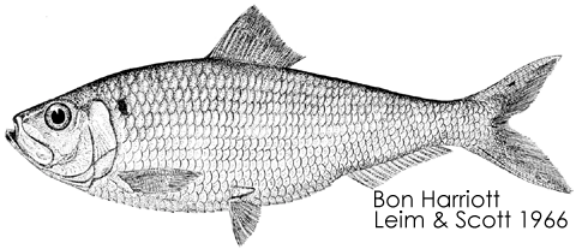
Fisheries and Oceans / Pêches et Océans

Gulf and Maritimes Regions

DFO Science
Stock Status Report D3-17(2001)



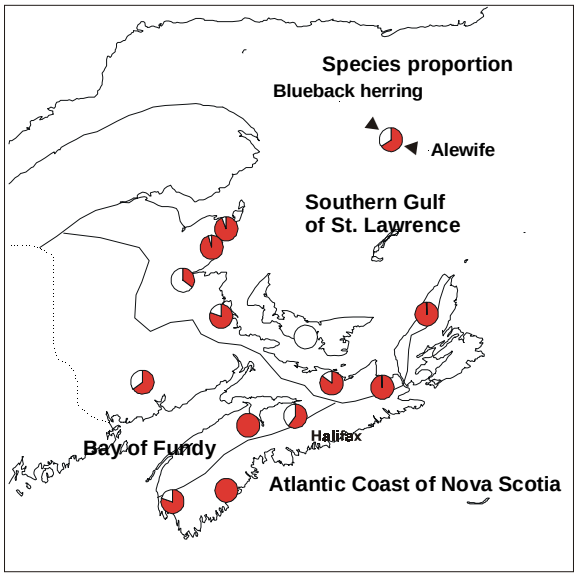
Gaspereau Maritime Provinces Overview

Background

Alewife (Alosa pseudoharengus) and blueback herring (Alosa aestivalis) are anadromous clupeids that frequent the rivers of the Maritimes. They are collectively referred to as gaspereau. Blueback herring occur in fewer rivers and are generally less abundant than alewives where both species co-occur. Spawning migrations of alewives typically begin in late April or early May, depending upon geographic area and water temperature, peak in late May or early June and are completed by late June or early July. Blueback herring enter the river about 2 weeks later than do alewives. Both species return to sea soon after spawning. Young-of-the-year gaspereau spend, at most, the first summer and fall in fresh water before migrating to the sea. Both species recruit to the spawning stock over 2-4 years. Spawning occurs first in both species at age 3 and virtually all fish have spawned by age 6. The mean age at first spawning is usually older for females than for males. Repeat spawners may form a high proportion (35-90%) of the stocks of both species, with higher proportions of repeat spawners where exploitation is low.

Gaspereau are harvested by gill, trap, and dip nets depending upon the river and location within the river system, e.g., gill net in the river mouth, dip net in the lower river, and trap net in lake areas and estuaries. Special tip-traps are used in the Margaree River and square-nets are used in the Gaspereau River.

In the absence of specific biological and fisheries information, the management objective is to maintain harvests at about long-term mean levels. Some stocks are assessed in greater detail. The reference point for southern Gulf of St. Lawrence (southern Gulf) gaspereau is defined on the basis of a fishing mortality level which does not exceed the natural mortality rate (equivalent to exploitation rates of 0.33 to 0.39). In the Bay of Fundy and Atlantic coast of Nova Scotia area, a reference exploitation level of 0.65 is used. The Saint John River stock at Mactaquac is managed on the basis of a fixed escapement target derived from analysis of stock and recruitment data.



Summary

- Gaspereau fisheries are generally small (<100 t annually). The larger fisheries (>1000 t) occur in the Saint John River (Bay of Fundy, NB) and the Miramichi River (southern Gulf, NB).

- For the Miramichi River, all licensed gear are currently active and the resource is exploited at or above reference levels. The fishery disproportionately harvests alewife and older blueback herring. Based on the estimate of the strength of the 1996 and 1997 year-classes for both alewife and blueback, abundance in 2001 is not expected to be high.

- The alewife stock of the Margaree River is currently at low abundance. Restrictive management measures initiated in 1996 combined with reduced effort in the fishery resulted in reduced

exploitation rates near reference levels between 1997 and 2000.

- In the other southern Gulf rivers, fishing exploitation rates have been high and landings are expected to remain low relative to historical levels until such time as the exploitation rates are reduced and spawning escapements are increased.

- Gaspereau fishery landings in the Bay of Fundy and Atlantic coast of Nova Scotia are expected to remain near current levels. In most rivers, present catches are below the long-term mean.

- Exploitation rates on the Gaspereau River exceed the reference level. The stock exhibits characteristics of a heavily impacted stock.

- For the Saint John River at Mactaquac Dam, the spawning escapement objectives have been met annually under the multi-year management plan.

- The gaspereau fishery of the lower tributaries of the Saint John River has been below its 1950-1999 mean catch for over 20 years. The downstream fishery disproportionately harvests alewives and early-run blueback herring.

The Fishery

The gaspereau fisheries are regulated by season, gear, and license restrictions. Few new licenses have been issued since 1993. Individual licenses may be for multiple and variable units of gear. The primary measures restricting exploitation rates are a limiting of licenses to existing levels in all areas and weekly close periods. Variations from the general closures and restrictions are instituted under river-specific management plans. The potential for bycatch of Atlantic salmon and striped bass is of concern, particularly in the southern Gulf rivers, Saint John and Shubenacadie rivers, where various restrictions, e.g. fishing season adjustments, and minimum fish length limits, are implemented.

Logbooks are issued to fishers in the Bay of Fundy and Nova Scotia Coast areas as a condition of license, and pilot programs are being considered in the Southern Gulf area of New Brunswick. The logbook participation rate is generally between 75% and 90%.

Gaspereau fisheries in the Maritimes are geographically and economically diverse. Reliable harvest information is available for only a few of the larger fisheries. In many areas, gaspereau used locally as bait for other fisheries may not be registered in the purchase slip database. Logbook programs may record a large portion of the catch.

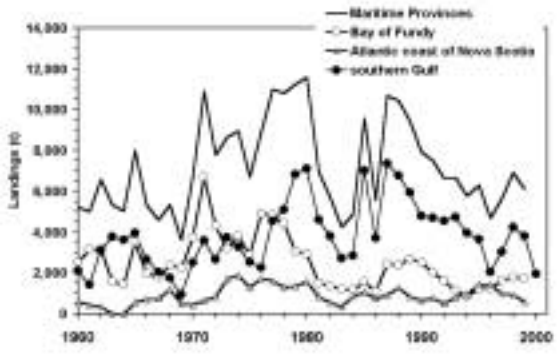
Reported landings from the Maritimes peaked in 1980 at just under 11,600 t. A second peak in 1988 of just under 10,500 t has been followed by a continuous decline to less than 5,000 t in 1996. In the last ten years, the southern Gulf harvests have represented between 44% and 71% of the total Maritime harvest.

Gaspereau landings (t)

Year	70-79 Avg.	80-89 Avg.	90-99 Avg.	1997	1998	1999	2000
Southern Gulf	3704	4848	3945	3030	4222	3795	1944
Atlantic Coast of Nova Scotia	1279	893	907	989	918	586	n.a.
Bay of Fundy	4184	1836	1580	1551	1780	1724	n.a.
Total	9167	7914	6427	5670	6920	6105	n.a.

n.a. means not available

Gaspereau landings (t)



The larger fisheries (> 1,000 t) occur in the Saint John River (Bay of Fundy, NB) and the Miramichi River (southern Gulf, NB). In most parts of the Maritimes, gaspereau fisheries are relatively small (< 100 t annually). There are large variations in annual landings. Declining landings are noted in the Saint John River, Margaree River, Gaspereau River, Mersey-Medway area and the eastern shore of Nova Scotia.

Resource Status

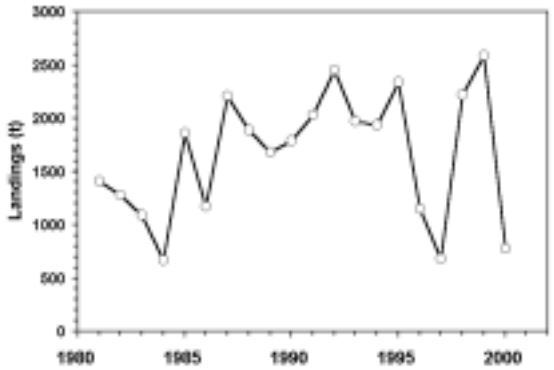
Southern Gulf

Two major fisheries of the southern Gulf have been monitored annually since 1983, the Miramichi River in New Brunswick and the Margaree River in Cape Breton, Nova Scotia. Less intensive and generally opportunistic sampling has been conducted on three other fisheries in New Brunswick, Richibucto, Tracadie and Pokemouche rivers.

Miramichi River

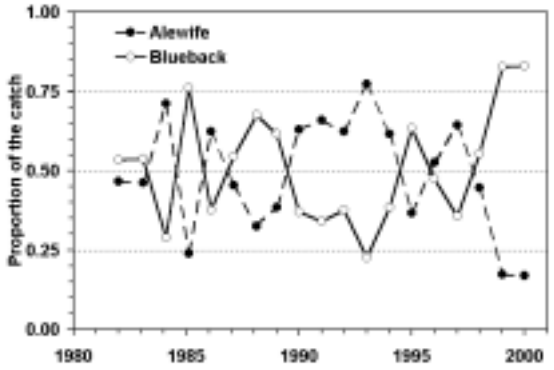
In 2000, there were 36 licensed trapnets. The number of licenses has remained relatively constant since 1970. The reported harvest of gaspereau has increased slightly since the early 1980s and has averaged about 1,500 t in the last five years.

Miramichi gaspereau landings (t)



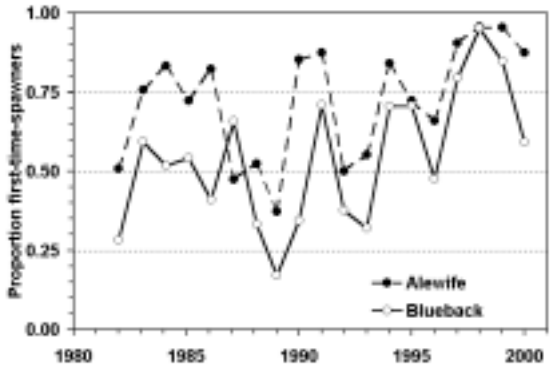
In the Miramichi River fishery, gaspereau catch composition has varied annually between 17% and 77% alewife by number.

Miramichi species composition of the catch



First-time-spawners have comprised between 37% and 96% of the alewife catches.

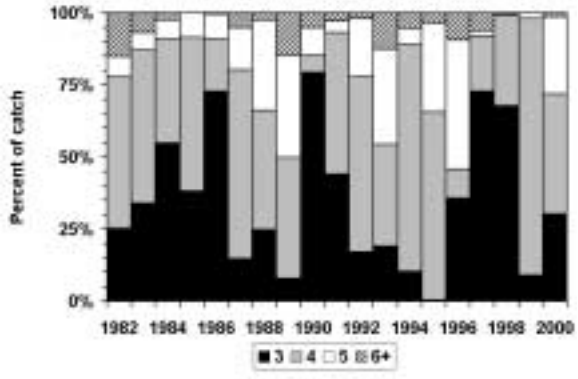
Miramichi proportion first-time spawners in the catch



First-time-spawners in the blueback herring catches have generally been lower than for alewife, varying between 17% and 95%.

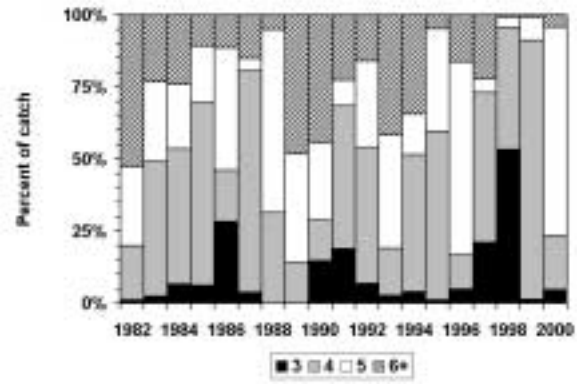
Alewives are predominantly harvested at age 4. Fewer than four ages generally contribute to the alewife harvest. Few alewives are older than age 6 in the fishery. The 1992 year-class is very weak with few fish of age 3, 4 or 5 in the catch.

Alewife – percent catch-at-age



Blueback herring catches are also dominated by single year-classes, either at age 4 or age 5. Blueback herring have a wider age distribution in the catches than do alewives, ranging from age 3 to 10.

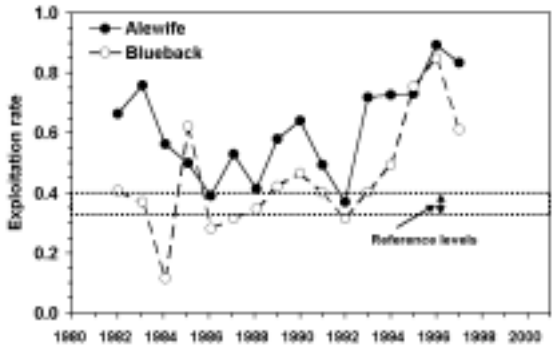
Blueback – percent catch-at-age



The 1992 year-class of blueback herring is also weak, as evidenced by the low catches of age 3 in 1995, age 4 in 1996 and age 5 in 1997. Fewer age-classes in the alewife spawning run compared to blueback herring are indicative of a higher mortality rate for alewife.

Exploitation rates for alewife and blueback herring were estimated after assuming an annual natural mortality rate of 0.33. The assumption of equal natural mortality rates for both species implies that differences between species in total mortality are due to different exploitation rates. Annual exploitation rates on alewife have varied between 0.39 and 0.89, above the reference exploitation rates of 0.33 to 0.39. Blueback herring exploitation rates have generally been lower than on alewife and frequently less than the reference levels except for recent years.

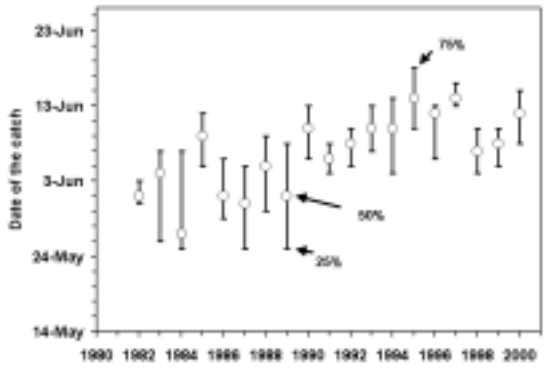
Gaspereau exploitation rates



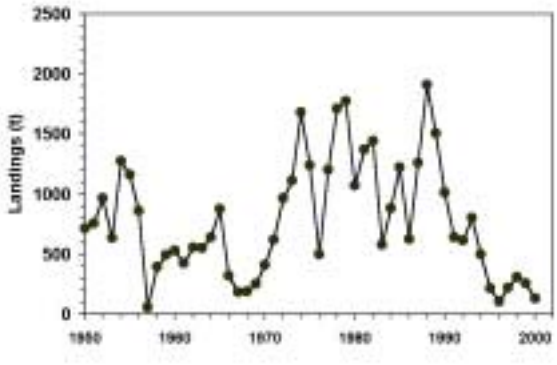
The lower exploitation rate on blueback herring is a consequence of their later spawning migration relative to alewife (about two weeks) and the closure of the fishery in mid-June when only a portion of the blueback herring stock is available to the fishery.

Since 1990, the timing of the fishery as described by the date when 50% of the annual catch was taken, has occurred later than in the 1980s. The timing of the fishery was earlier in 1998 and 1999 than in the rest of the decade, but still later than the 1980s.

Timing of the Miramichi fishery



Margaree gaspereau landings (t)



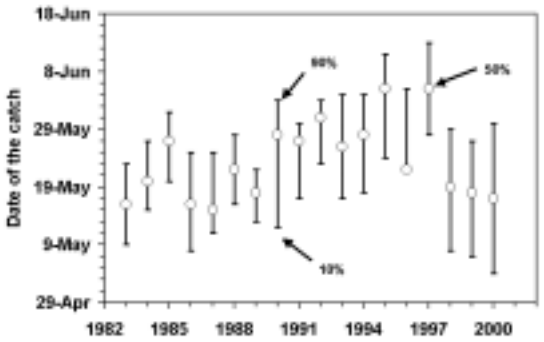
In 1995 to 2000, a later timing of the fishery was expected because of the delay of the season from May 15-June 15 to May 19 or 20 to June 20. The run of gaspereau in 1995 and 1996 was also later than in the 1980s as observed at the DFO index trapnets in the Southwest and Northwest branches of the Miramichi. In 1995 and 1997, about half the gaspereau were counted at the index trapnets after June 20, the regular closing date of the fishery. About 25% and 20% of the total gaspereau catch for the year at the index trapnet occurred after June 20, in 1996 and 2000, respectively.

<u>Margaree River</u>

In the Margaree River, alewives make up more than 95% of the gaspereau harvest. Alewives have returned to the river as early as mid-April but the major run occurs in the second to fourth weeks of May. Historically, the harvest peaked in 1988, and has declined precipitously since, largely due to the decreased abundance of gaspereau. The reported harvest of 94 t in 1996 and 121 t in 2000 are the second and third lowest since 1957.

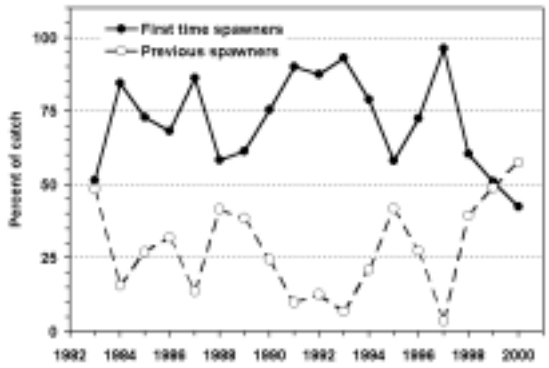
The timing of the fishery has varied. Since 1990, the fishery has occurred mostly in the latter part of May and beginning of June in contrast to the 1980s when a large portion of the fishery occurred in May. The fisheries in 1995 and 1997 were the latest on record with a median date of harvest of June 6. The 1996 fishery was comparatively earlier than in 1995 and the catches in 1998 to 2000 occurred at similar dates to the 1980s.

Timing of the Margaree gaspereau fishery



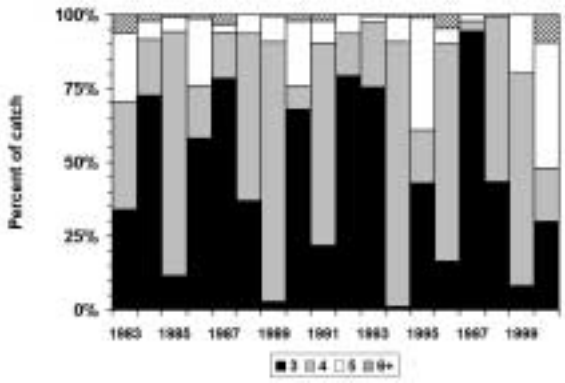
In terms of catch composition, the 1995 and 1996 harvests contained high percentages of first-time-spawners, 58% and 72% respectively, but the proportions declined in 1999 and 2000. Since 1983, the percentage of first-time-spawners in the annual harvests has varied between 42% (in 2000) and 96% (in 1997).

Margaree alewife catch composition



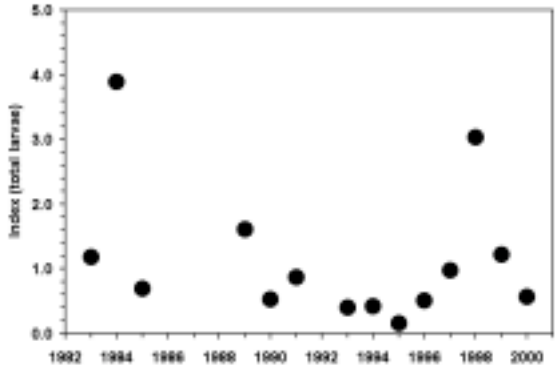
There are generally less than three age-groups in the spawning run and the fishery with a single age group (year class) comprising between 36% and 95% of the total annual catch. In 2000, for the first time since sampling began in 1983, age 5 alewives (1995 year class) were the most abundant (43%) age group in the catch.

Margaree alewife catch-at-age



An index sampling program for gaspereau larvae has been conducted in 14 of 18 years since 1983. The larval index is assumed to be an indicator of escapement into Lake Ainslie which is the spawning area for gaspereau in the Margaree River. The larval index was high in two years, 1984 and 1998, and remained low in most other years, particularly 1993 to 1996. A more restrictive management plan intended to increase spawning escapement was put in place in 1996. Increased larval abundance was observed in subsequent years.

Margaree gaspereau larvae index



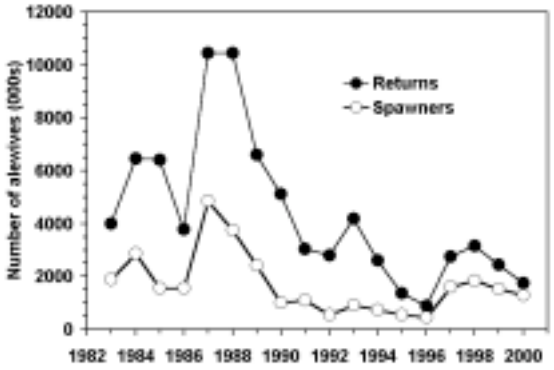
The exploitation rates, spawning escapement, and returns were estimated for years 1983 to 2000 using a cohort analysis and the larval index series.

Exploitation rates (under the assumption of a constant annual natural mortality rate of 0.33) exceeded the reference exploitation levels (0.33 to 0.39) every year between 1983 and 1996. Estimated exploitation rates declined to near reference levels between 1997 and 2000 but these are considered underestimates (years with open circles in the figure below) because of a retrospective bias in the estimation procedure. The underestimates are not large and the unbiased values are expected to be about 0.5, well below the exploitation rates of the late 1980s and early 1990s. The more restrictive management measures in place since 1996 as well as the fewer active fishers were effective in reducing the exploitation rates.

Margaree alewife exploitation rates

The returns of alewife to the Margaree River have been as high as 10 million fish in 1987 and 1988. Historically, spawners have been as high as more than 4 million fish. In response to the low abundance of 1995, a more restrictive management plan was put in place in 1996 and spawners increased to about 2 million fish by 1997.

Margaree alewife returns and spawners



Other Southern Gulf Rivers

Gaspereau fisheries of the other southern Gulf NB rivers have historically been smaller than the Miramichi and Margaree fisheries. In the **Richibucto**, **Tracadie** and **Pokemouche** rivers, there have been generally less than four age classes in the fishery with no alewives older than age 6. Blueback herring comprise less than 25% of the harvests in the Richibucto River and less than 5% of the harvests in the other rivers. First-time-spawners make up important proportions of the harvests annually in all the rivers. The restricted age distribution in the catches, the absence of alewives older than age 6 and the high proportion (60% to 98%) of first-time-spawners in the harvests are indicative of heavily exploited stocks. Based on the information from the Miramichi River assessment, the exploitation rates in these rivers probably exceed the reference levels.

The status of the gaspereau resource on Prince Edward Island is poorly known. Most catches are used as bait. These catches are not reliably recorded by official statistics. There are anecdotal reports of rivers where gaspereau runs have disappeared after periods of intensive fishing, but the extent to which overfishing may have caused local extirpations is unknown.

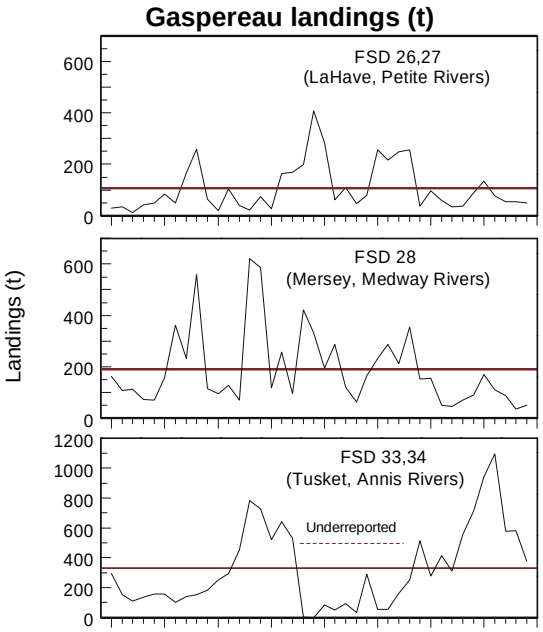
Atlantic Coast of Nova Scotia

The major fisheries for gaspereau along the Atlantic coast of Nova Scotia occur in rivers south of Halifax, such as the LaHave, Mersey, Medway, Tusket and Annis rivers. Minor fisheries occur along the Eastern Shore north of Halifax. Annual mean harvests tend to decline from south to north along the Atlantic coast, from highest in the Tusket River area, lower in the Mersey and Medway rivers, low in the LaHave River, and least along the Eastern Shore. Harvests are reported by Fishery Statistical District (FSD), which may share a large river with another FSD or contain more than one river. Harvests attributed to a specific river actually refer to the Fisheries Statistical District(s) in which that river occurs and will include harvests from other rivers in that FSD.

Use of the logbook system after 1992 has enabled catch and fishing effort data to be assembled by individual river and gear type. The time-series of data for individual rivers are short but consistent with the data by

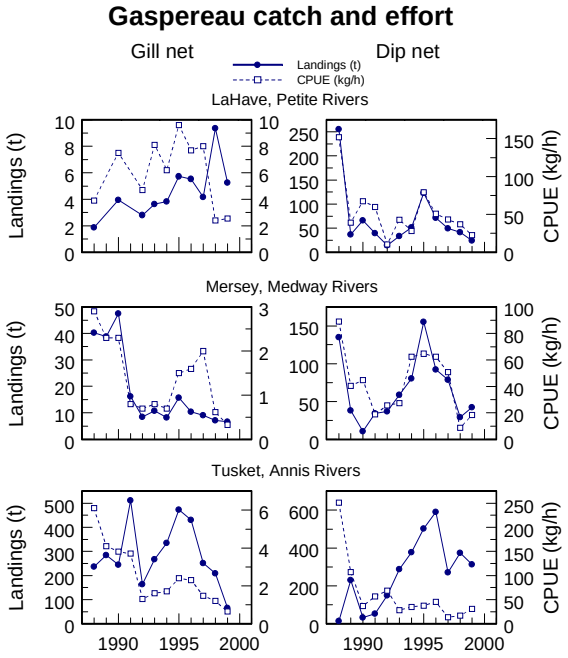
FSD. Logbook data indicate that annual gaspereau harvests and catch per unit of fishing effort (CPUE) vary among gear types within a river and among rivers.

Reported harvests from the Atlantic coast of Nova Scotia varied from 337 t to 1,882 t between 1960 and 1999. Higher catches in the Tusket River during the mid-1990s are probably due to increased production of gaspereau in the Carlton River tributary following opening of the new fishway in 1989.



Recent harvests have declined to near the 1960-1999 mean of 331 t in the Tusket and Annis rivers, are below the mean of 107 t in the LaHave River, and are well below the mean of 190 t in the Mersey and Medway rivers. Catches were underreported in the Tusket River between 1978 and 1988.

In recent years, dip nets take most of the catch in the LaHave, Petite, Mersey, Medway, Tusket and Annis rivers. In the LaHave and Mersey and Medway rivers, the similarity of catch and CPUE trends for a given gear type suggest that catch level depends on run size. In the Tusket River, a large increase in fishing effort produced the high catches of the mid-1990s.

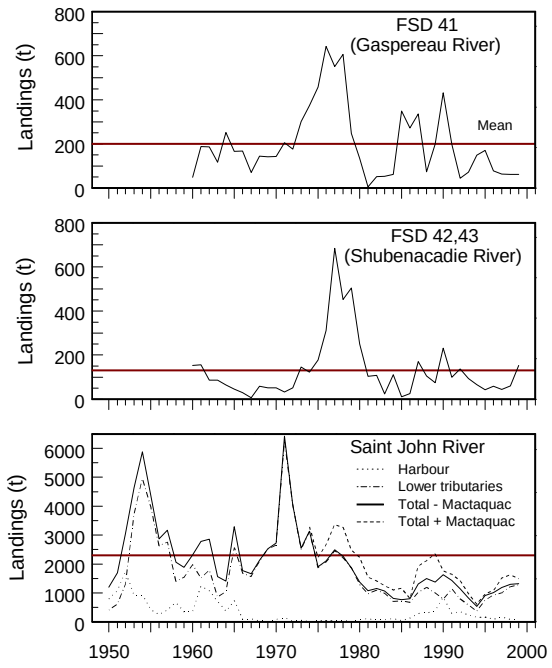


Bay of Fundy

Within the Bay of Fundy, the largest gaspereau fishery occurs in the Saint John River, New Brunswick followed by moderate fisheries in the Shubenacadie and Gaspereau rivers of Nova Scotia. No commercial fishery is permitted in the Annapolis River. In the Saint John River, the fishery in the harbour uses drift and set gill nets while the upriver fishery primarily uses trap nets. A harvest also occurs at the Mactaquac Dam on the Saint John River. Drift gill nets and dip nets at weirs are used in the Shubenacadie River while the square net is unique to the Gaspereau River.

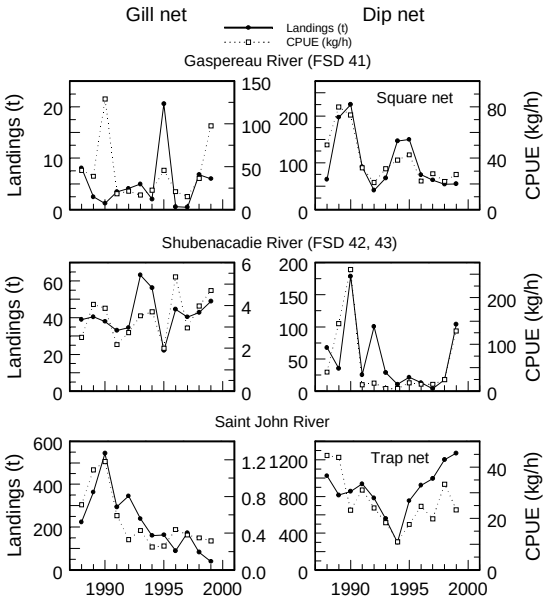
Reported harvests from the Bay of Fundy varied from about 860 t to 6,700 t between 1960 and 1999. Since 1980, most harvests have been below the 1960-1999 mean of 2,493 t. Since 1990, harvests have been 50-70% of the mean.

Gaspereau landings (t)



Catch and CPUE have varied widely among gear types and rivers.

Gaspereau catch and effort



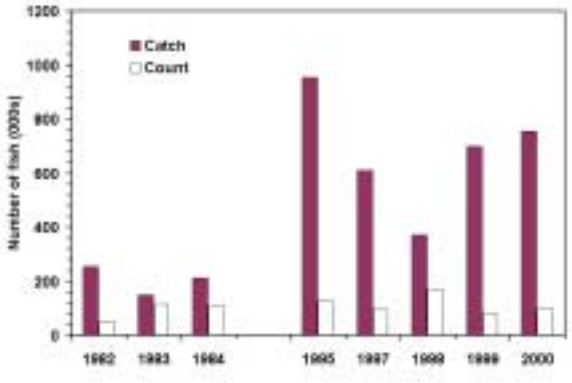
Gaspereau River

The commercial fishery occurs along the 4 km stretch of river between the head of tide and the White Rock Generating Station. Currently, 15 square net licences are issued on this river. Under current regulations, the fishing season opens March 15. Fishing begins when alewife first enter the river in late April or early May, and the season closes May 31. The fishery is closed on weekends. The stock consists almost entirely of alewife.

Since 1964, landings have averaged 208 t, peaking in 1978 at 605 t. The landings in 2000 totaled 180 t.

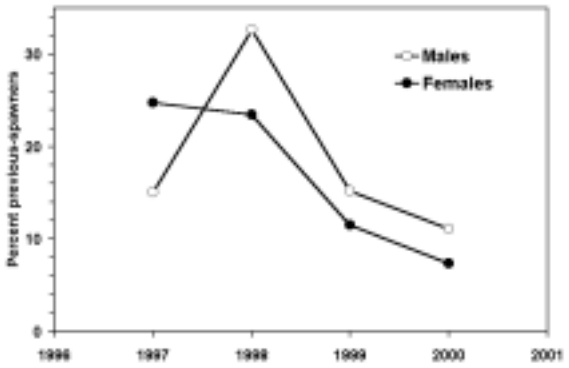
Fish counts at the White Rock fishway (1997-2000) ranged from 81,326 to 171,639 fish. These counts are used as estimates of escapement from the fishery. Assuming that all fish not taken by the fishery ascend the White Rock fishway, exploitation rates were estimated to be 0.89 in 1999 and 0.88 in 2000. These rates are above the reference level of 0.65.

Alewife - Gaspereau River

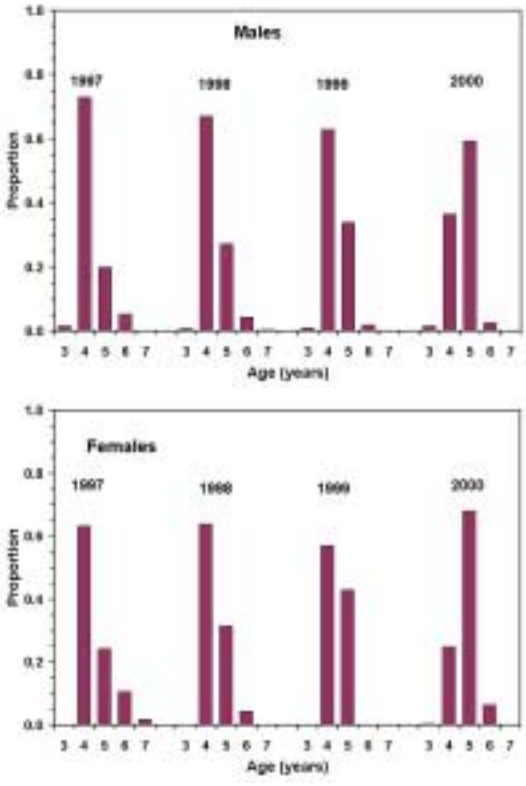


The stock exhibited the characteristics of a heavily impacted stock in each of seven assessments since 1982. The majority of spawning fish belong to only two age-classes, and the percentage of previous spawners in the run averaged less than 15% in 1999 and 2000.

Gaspereau River percent previous spawners



Gaspereau River alewife age composition by sex



Not all fish that ascend the White Rock fishway complete the spawning migration to Gaspereau Lake, which is considered to be the primary alewife spawning area in the watershed. Many of the late-running fish are thought to spawn downstream of Gaspereau Lake, but may not significantly contribute to alewife production in this watershed.

Two different models indicate that the number of spawners that are required to produce maximum sustainable yield (MSY) for this stock is higher than current levels. A hierarchical stock and recruitment model of five alewife populations suggests that MSY in the Gaspereau River occurs when about 450,000 spawners reach Gaspereau Lake. A life history model fitted to Gaspereau River alewife data suggests that MSY occurs when 400,000 spawners reach Gaspereau Lake. The models do not directly consider other sources of anthropogenic mortality. Under current water management practices, alewives are diverted past four of the five generating stations in the watershed. Mortality of alewives at the White Rock Generating Station is unknown, but could potentially reduce MSY.

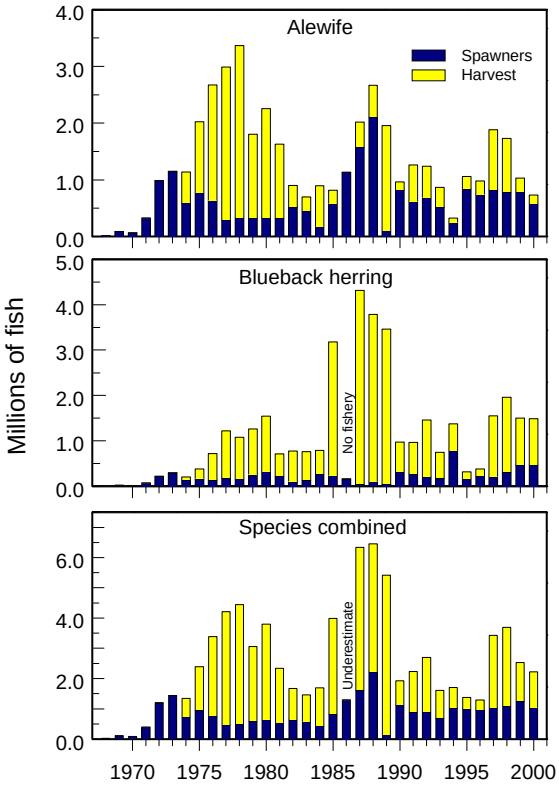
<u>Saint John River at Mactaquac Dam</u>

Since completion of the Mactaquac Dam in 1968, annual runs of both alewives and blueback herring have increased and varied widely.

Prior to 1974, all gaspereau arriving at the Mactaquac Dam fishlift were trucked and released upriver. As the run of gaspereau grew, delays in clearing the large numbers of gaspereau from the fishlift were perceived as delaying the entrance of early run Atlantic salmon and of increasing unacceptably the cost of upriver transport. In 1974, a fishery was established to reduce fishway use conflicts between gaspereau and early run Atlantic salmon and to reduce costs of fish transport upriver.

The total return (spawners + harvest) of alewife and blueback herring to the Mactaquac Dam first peaked in the late 1970s, 4-5 years after rising spawning escapements of the early 1970s. The proportion of alewives in the run varied from 19% to 85% (mean 57%) between 1972 and 1999.

Gaspereau at Mactaquac Dam

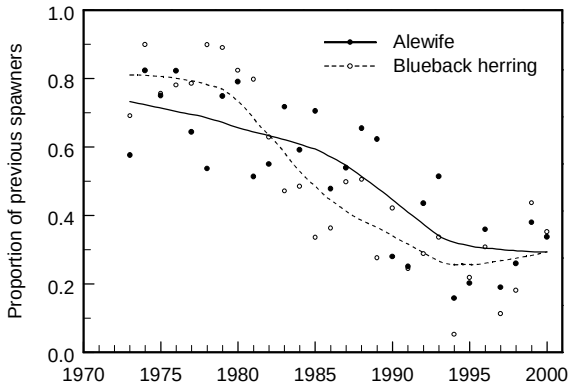


The Mactaquac Dam gaspereau stock has had several management regimes. Since 1995, the annual spawning escapement objectives have been 800,000 alewives and 200,000 blueback herring. Fish surplus to the objectives have been harvested. This has resulted in a wide range of exploitation rates.

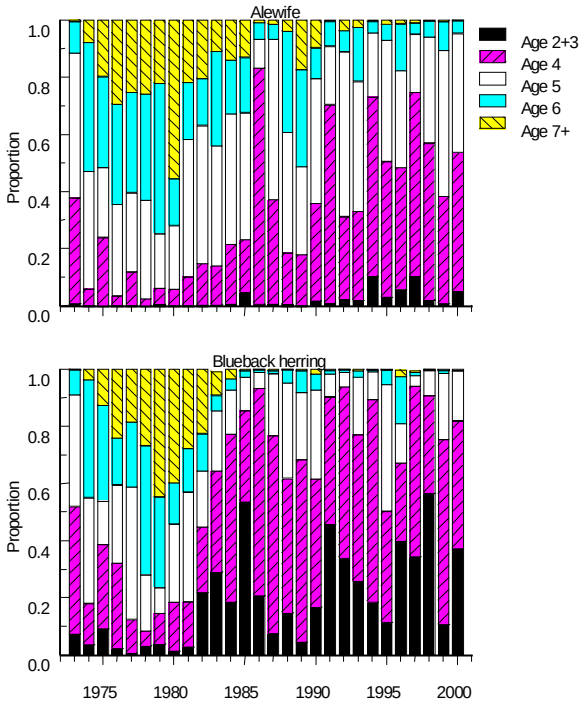
Since 1974 when the commercial fishery at the Mactaquac Dam began, exploitation rates have ranged from 12% to 90% (median 43%) for alewives and from 33% to 99% (median 79%) for blueback herring. Since 1990, the exploitation rate has averaged 33% for alewives and 68% for blueback herring.

The proportion of previous spawners has declined from about 0.8 in the mid-1970s to 0.3 in the late 1990s for alewives and blueback herring at the Mactaquac Dam.

Mactquac Dam proportion previous spawners



The age composition of alewives and blueback herring at the Mactaquac Dam has changed from having 40-75% of fish older than age-5 during the late 1970s. During the late 1990s, the age composition was 50-90% ages 3 and 4 for blueback herring and 80-90% ages 4 and 5 for alewives. In 2000, the alewife run to the Mactaquac Dam included six year-classes (ages 2-7). Age-2 fish are sexually immature, generally few in number and only periodically present. The blueback herring run contained four year-classes (ages 3-6). Previous spawners comprised about 34% of the alewife and 35% of the blueback herring components of the run.

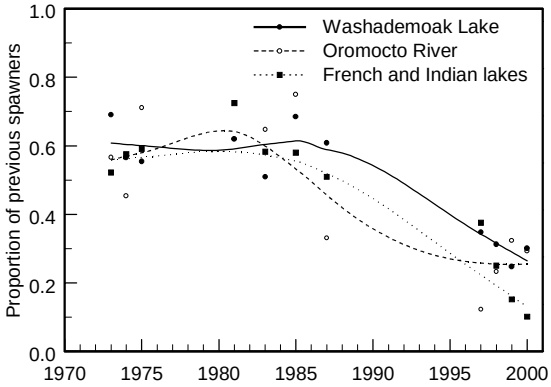


High returns of both alewives and blueback herring occurred during the late 1980s from moderate spawning escapements. High numbers of spawners during the late 1980s did not produce high returns during the early and mid-1990s. The high variability in returns for a given spawning escapement at the Mactaquac Dam reduces the predictive usefulness of the stock-recruitment relation.

Lower tributaries of the Saint John River

In 2000, the alewife catches in the lower tributaries of the Saint John River varied in age composition. In Washademoak Lake, there were 7 year-classes (ages 3-9) of alewives while in the French and Indian lakes and the Oromocto River, there were 5 age classes (ages 3-7). Alewives of ages 4 and 5 comprised 75% of the catch in Washademoak Lake, 80% in the Oromocto River and 95% in French and Indian lakes. Blueback herring age compositions are not reported due to incomplete sampling of the run and small sample sizes. The proportion of previous-spawning alewives has declined from 0.4-0.7 during the 1970s and 1980s to 0.1-0.4 in the late 1990s.

Lower tributaries of the Saint John – proportion previous spawners



Outlook

Southern Gulf

Miramichi River

In the Miramichi River, the 1994 and 1995 year-classes of alewives were strong but the incoming 1996 and 1997 year-classes appear weak. For blueback herring, the 1995 year-class is strong although the 1996 and 1997 year-classes appear weak. Based on the estimate of the strength of the 1996 and 1997 year classes for both alewife and blueback, abundance in 2001 is not expected to be high. Alewife abundance had been increasing but like blueback herring, abundance has declined in the last two years. At present effort levels, no important increases in harvests are expected in the next few years.

Margaree River

The gaspereau stock of the Margaree River is currently at low abundance. Improved escapements for the years 1997 to 2000 will provide a better chance of recruitments increasing over the next five years. If exploitation rates continue to be low relative to historical levels, then more older and larger fish should be available to the fishery and for spawning. An expanded age

structure in the catch and in the spawning escapement is desirable and expected if exploitation levels are maintained or further reduced from present levels. The long-term prospects for the stock and the fishery depend upon the achievement of spawning escapements to Lake Ainslie in excess of one million spawners, a level achieved in 1997 to 2000.

Other Southern Gulf Rivers

In the other southern Gulf rivers, exploitation rates have been high and harvests are expected to remain low relative to historical levels until such time as the exploitation rate is reduced and spawning escapement is increased. However, there is no basis for predicting trends in PEI's gaspereau stocks.

Atlantic Coast of Nova Scotia

Reported catches of gaspereau in the Nova Scotia Coast area are expected to remain below historical mean levels.

Bay of Fundy

Gaspereau catches in the lower tributaries of the Saint John River and Gaspereau River are expected to remain below their long-term means.

Required spawning escapements for alewives and blueback herring in the Saint John River at Mactaquac Dam are expected to be met, thereby permitting a fishery on those fish surplus to the spawning escapement objectives.

Management Considerations

Since fewer licenses are fished than have been issued and exploitation rates are generally above reference levels, there is concern that an increase in fishing effort could occur in response to favourable market or stock conditions. This increased effort would result in higher exploitation rates. Additional management measures may be required to address this situation.

The incomplete harvest data records and the absence of biological data for most of the gaspereau stocks make precautionary management advisable for the gaspereau fisheries of the Maritimes. Under this approach there should be no increase, and preferably a decrease, in the level of exploitation.

An appropriate management objective is to rebuild stocks so that future harvests can be maintained near the long-term level. Where detailed assessments are conducted in the southern Gulf stocks, the management objective is to ensure that annual fishing exploitation rates do not exceed the reference levels of 33% to 39% of the spawning stock.

River-specific management plans which have been implemented as a result of stock assessment information should be given priority over general management initiatives.

Southern Gulf

For the Miramichi River, all licensed gear are currently active and the resource is exploited at or above reference levels. Exploitation rates have increased in recent years. Fishing mortality on alewife tends to be higher than on blueback herring. This has been most relevant since 1990 because of the later migrations and the fixed closure date for the fishery. The fishery disproportionately harvests alewife and older blueback herring tend to be more heavily exploited than the younger aged fish. There continues to be fewer age-classes in the alewife spawning run compared to the blueback herring and this is considered

indicative of higher exploitation on the alewife.

Weekend closures in May should contribute to reducing the exploitation rate on the alewife. The benefits will be reduced when run timing is delayed as occurred in the 1990s. If exploitation rates on blueback herring rise above those of recent years, then weekend closures in June could be of benefit to both alewife and blueback herring. Several bycatch considerations in this fishery constrain the options available for season adjustment: spawning striped bass are intercepted at the beginning of the fishery and bright Atlantic salmon at the end of the fishery.

For the Margaree River, the exploitation rates since 1983 have greatly exceeded the reference levels. Restrictive management measures initiated in 1996 combined with reduced effort in the fishery resulted in estimated exploitation rates which are closer to reference levels. Until such time as recruitment improves, the restrictive measures should be maintained with the long-term objective of ensuring that exploitation rates do not exceed the reference levels.

Atlantic Coast of Nova Scotia and Bay of Fundy

Gaspereau fishery landings in the area are expected to remain near current levels which, in most rivers, are below the long-term mean.

Current exploitation rates on the Gaspereau River are above the reference level of 0.65. Spawning escapements are at best 40% of that estimated to produce MSY. Exploitation rates must be reduced to increase escapement and ultimately production. A reduced exploitation rate should increase the size and age distribution. The watershed has been extensively modified for hydroelectric generation. Appropriate passage facilities for upstream and downstream migrating fish are required for fishery conservation measures, such as reduced exploitation, to be effective.

For the Saint John River at Mactaquac Dam, the spawning escapement objective has been met annually under the multi-year management plan and should be maintained.

The gaspereau fishery of the lower tributaries of the Saint John River has been below its long-term mean catch for over 20 years and current biological data indicate that the stock is heavily fished.

For more Information:

Contact: Brian Jessop
Science Branch
Dept. of Fisheries and Oceans
P.O. Box 1006
Dartouth, N.S. B2Y 4A2

Tel: 902 426-2158
Fax:902 426-6814
E-Mail:Jessopb@mar.dfo-mpo.gc.ca

Gérald Chaput
Science Branch
Dept. of Fisheries and Oceans
P.O. Box 5030
Moncton, NB E1C 9B6

Tel: 506 851-2022
Fax:506 851-2147
E-Mail:ChaputG@dfo-mpo.gc.ca

References

Chaput, G., and G. Atkinson. 2001. The gaspereau fisheries *(Alosa pseudoharengus* and *A. aestivalis*) of the Miramichi River with updates on

the fishery of the Richibucto River of Gulf New Brunswick. DFO Can. Stock Ass. Sec. Res. Doc. 2001/047.

Chaput, G., P. LeBlanc, and R. Crawford. 2001. Assessment of the Margaree River gaspereau fishery, 1997 to 2000. DFO Can. Stock Ass. Sec. Res. Doc. 2001/046.

DFO, 1997. Maritmes Region Gaspereau Overview. DFO Science Stock Status Report D3-17.

Gibson, A.J.F. and R.A. Myers. 2001. Gaspereau River alewife stock status report. DFO Can. Sci. Adv. Sec. Res. Doc. 2001/061.

Jessop, B. 2001. Stock status of alewives and blueback herring returning to the Mactaquac Dam, Saint John River, N.B. DFO Can. Sci. Adv. Sec. Res. Doc. 2001/059.

Jessop, B. 2001. A brief assessment of the commercial gaspereau fishery on the lower Saint John River, N.B. DFO Can. Stock Ass. Sec. Res. Doc. 2001/060.

This report is available from the:

Maritime Provinces
Regional Advisory Process
Department of Fisheries and Oceans
P.O. Box 1006, Stn. B203
Dartmouth, Nova Scotia
Canada B2Y 4A2
Phone number: 902-426-7070
e-mail address: myrav@mar.dfo-mpo.gc.ca

Internet address: www.dfo-mpo.gc.ca/csas
ISSN: 1480-4913

La version française est disponible à l'adresse ci-dessus.

Correct citation for this publication

DFO, 2001. Gaspereau Maritime Provinces Overview. DFO Science Stock Status Report D3-17(2001).