

Mactaquac Dam, New Brunswick Gaspereau Report 2019

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**Canadian Data Report of
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Canadian Data Report of Fisheries and Aquatic Sciences

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Les numéros 1 à 25 de cette série ont été publiés à titre de Records statistiques, Service des pêches et de la mer. Les numéros 26-160 ont été publiés à titre de Rapports statistiques du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom de la série a été modifié à partir du numéro 161.

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MACTAQUAC DAM, NEW BRUNSWICK GASPEREAU REPORT 2019

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ABSTRACT

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In 1989, in consultation with stakeholders, Fisheries and Oceans Canada (DFO) agreed to annually transport one million gaspereau (Alewife (*Alosa pseudoharengus*) and Blueback Herring (*Alosa aestivalis*)) from the St. John River, NB, around the Mactaquac Dam and release them in the headpond. Once the annual gaspereau escapement program commenced, three staff worked 12 hours per day, seven days per week, until escapement targets of 800,000 Alewives and 200,000 Blueback Herring were met. Following a reduction in effort to 10 hours per day, six days per week in 2012, the Blueback Herring minimum escapement target was met each year, but the Alewife target was only met in 2014 and 2015. In 2018 and 2019, when the schedule was returned to three staff working 12 hours per day, seven days per week, targets for both species were met. To reach the 800,000 Alewives and 200,000 Blueback Herring escapement targets, schedule a crew of three trained staff per day (two of them as truck drivers) to work for 12 hours per day, seven days per week, with uninterrupted operation of the Mactaquac Fish Collection Facility for the duration of the gaspereau escapement program.

RÉSUMÉ

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En consultation avec divers intervenants, Pêches et Océans Canada (MPO) a accepté en 1989 de transporter chaque année un million de gaspareaux (*Alosa pseudoharengus*) et d'aloses d'été (*Alosa aestivalis*) du fleuve Saint-Jean (Nouveau-Brunswick) au barrage de Mactaquac afin de les relâcher dans le bassin d'amont. Une fois que le programme annuel de protection du gaspereau de remonte a été lancé, trois employés ont travaillé 12 heures par jour, 7 jours sur 7, jusqu'à ce que l'objectif visant l'échappement de 800 000 gaspareaux et de 200 000 aloses d'été soit atteint. Après la réduction de l'effort à 10 heures par jours, 6 jours par semaine en 2012, l'objectif d'échappement minimal de l'alose d'été a été atteint chaque année, alors que l'objectif lié au gaspereau a seulement été atteint en 2014 et en 2015. Les objectifs liés aux deux espèces ont été atteints en 2018 et en 2019, quand l'horaire du programme est repassé à 12 heures de travail par jour, 7 jours sur 7. Afin d'atteindre l'objectif visant l'échappement de 800 000 gaspareaux et de 200 000 aloses d'été, un groupe de trois employés formés (dont deux conducteurs de camion) travaille 12 heures par jour, 7 jours sur 7, sans interruption de l'installation de capture du poisson de Mactaquac, pour toute la durée du programme de protection du gaspereau de remonte.

BACKGROUND

The area upstream of Mactaquac Dam supports gaspereau (Alewife (*Alosa pseudoharengus*) and Blueback Herring (*Alosa aestivalis*)) populations thought to be distinct from populations elsewhere in the Saint John River, NB. The seasonal gaspereau spawning run occurs every spring during May and June, with the Alewife component commencing migration during the first or second week of May, approximately two weeks prior to the Blueback Herring component. In 1989, in consultation with stakeholders, Fisheries and Oceans Canada (DFO) agreed to annually transport one million gaspereau (800,000 Alewives and 200,000 Blueback Herring) around the Mactaquac Dam and release them in the headpond.

In 2012, DFO reduced the “trap and truck” program from 12 hours per day, seven days per week to 10 hours per day, 6 days per week, without a concomitant reduction in escapement target. Although meeting escapement targets was viewed as a regional priority, the reduction in effort greatly impeded DFO's ability to meet the targets of moving 800,000 Alewives and 200,000 Blueback Herring. In 2018 and 2019, effort was made by DFO Science to maximize the likelihood of meeting escapement targets, by returning to a full schedule of 3 staff for 12 hours per day, seven days per week. In 2018, the trap and truck operation ran from May 19th to June 1st for 13 days. In 2019, the operation ran from May 16th to May 30th for 15 days. Targets were met in both of those years.

METHODS

DFO has a Memorandum of Understanding (MOU) with NB Power (NBP) to operate the Mactaquac Fish Collection Facility (FCF) starting May 1st, or on the first Monday of every May. DFO requires three general conditions to start fishing for gaspereau:

1. The FCF is fully operational and has had a test-run;
2. Spilling has stopped at Mactaquac Dam and the tail race levels are at 19 feet or less (to avoid mechanical breakdowns);
3. Gaspereau are present in sufficiently large quantities within the FCF (with all four fishway pumps running) to start trucking.

Once the gaspereau escapement program commences, three staff work 12 hours per day for seven days per week, from 07:30-20:00 daily, until the escapement totals of 800,000 Alewives and 200,000 Blueback Herring are met. Conditions that impede gaspereau escapement trucking include, but are not limited to: delayed spring ice-out and flooding season (keeping the tail race levels too high with too much debris), cold water temperatures, rain keeping the gaspereau from entering the FCF, mechanical issues, and any shut-downs from NBP for maintenance or repair issues (including for Mactaquac Unit #1).

The gaspereau escapement program uses a 5-ton truck with a 500-gallon fiberglass tank to transport gaspereau. The tank is loaded from a 5-ton capacity hopper basket, which can hold 2,500 live gaspereau and water per truck load. A maximum of 40 trips per day are undertaken (approximately one truck load every 15 minutes while in

operation). A sample of 50 gaspereau is taken every four hours (at 10:00, 14:00, and 18:00 hrs) to determine the proportion of Alewives to Blueback Herring per truck load. These percentages are then used to track the number of each species transported over the Mactaquac Dam, in order to determine when escapement targets are met.

RESULTS

Following the implementation of a reduced staff schedule in 2012, Blueback Herring minimum escapement target quotas were met in most years (Figure 1, Table 1), but Alewife targets were only met in 2014 and 2015 (Figure 1, Table 1). In 2018 and 2019, when the program returned to a 12 hours per day, seven days per week schedule, escapement targets were met for both species. A total of 800,700 Alewives and 319,300 Blueback Herring, for a grand total of 1,120,000 gaspereau, were transported to the Mactaquac headpond in 2018 (Table 2). A total of 836,300 Alewives and 204,700 Blueback Herring, for a grand total of 1,041,000 gaspereau, were transported to the Mactaquac headpond in 2019 (Table 3).

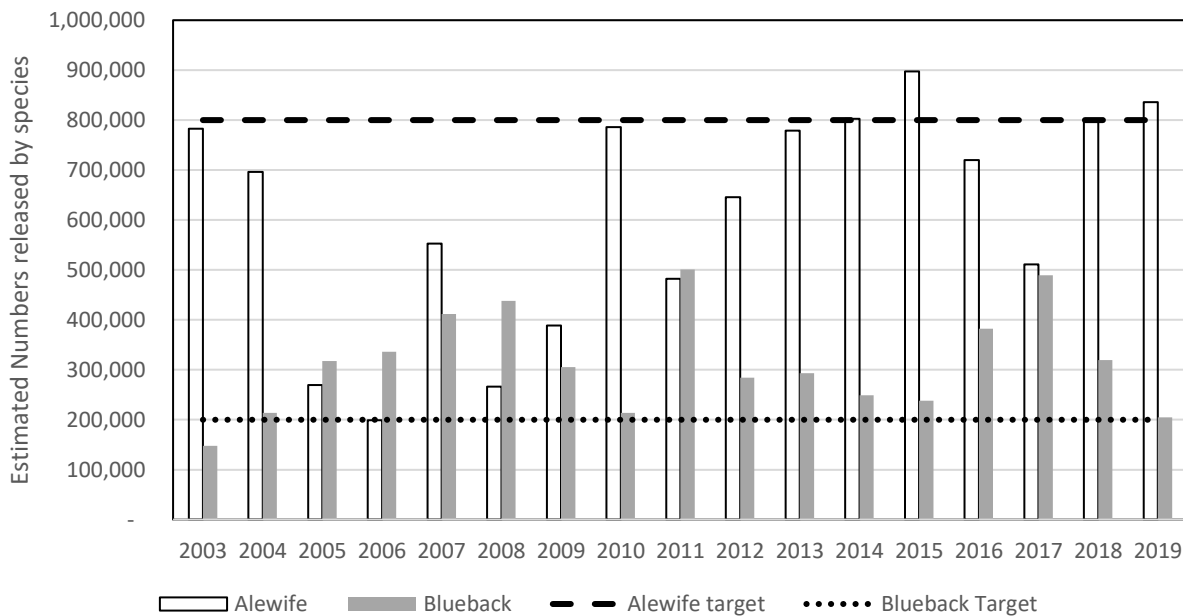


Figure 1. Estimated numbers of Blueback Herring and Alewife released above Mactaquac Dam by year (2003-2019). The dashed line represents the Alewife escapement target of 800,000 and the dotted line represents the Blueback Herring escapement target of 200,000.

Table 1. Historical total numbers of Alewife and Blueback Herring released above Mactaquac Dam (2003-2019). Numbers in bold print indicate years in which target quotas of species were met.

Year	Start	End	ESCAPEMENT		
			Alewives	Blueback Herring	Total Gaspereau
2003	21-May	30-May	782,500	147,500	930,000
2004	18-May	1-Jun	696,400	213,600	910,000
2005	20-May	3-Jun	269,800	317,700	587,500
2006	16-May	7-Jun	198,700	336,300	535,000
2007	23-May	19-Jun	552,600	411,600	964,200
2008	28-May	11-Jun	266,000	437,700	703,700
2009	16-May	28-May	389,000	305,500	694,500
2010	4-May	21-May	786,000	214,000	1,000,000
2011	24-May	5-Jun	482,000	500,500	982,500
2012	14-May	25-May	645,600	284,400	930,000
2013	10-May	23-May	779,100	293,400	1,072,500
2014	17-May	3-Jun	802,600	249,200	1,051,800
2015	11-May	30-May	897,200	237,800	1,135,000
2016	13-May	6-Jun	720,000	382,500	1,102,500
2017	18-May	5-Jun	510,800	489,200	1,000,000
2018	19-May	1-Jun	800,400	319,600	1,120,000
2019	16-May	30-May	836,100	204,900	1,041,000

Table 2. Daily total numbers of Alewife and Blueback Herring released above Mactaquac Dam (2018).

DATE	ESCAPEMENT		
	Alewives	Blueback Herring	Total Gaspereau
19-May-18	44,500	500	45,000
20-May-18	90,900	9,100	100,000
21-May-18	85,400	7,100	92,500
22-May-18	79,500	15,500	95,000
23-May-18	67,300	17,700	85,000
24-May-18	75,800	19,200	95,000
25-May-18	62,700	19,800	82,500
26-May-18	69,100	30,900	100,000
27-May-18	64,300	35,700	100,000
28-May-18	65,100	32,400	97,500
29-May-18	45,400	52,100	97,500
30-May-18	38,100	61,900	100,000
1-Jun-18	12,600	17,400	30,000
GRAND TOTAL:	800,700	319,300	1,120,000

Table 3. Daily total numbers of Alewife and Blueback Herring released above Mactaquac Dam (2019).

DATE	ESCAPEMENT		
	Alewives	Blueback Herring	Total Gaspereau
16-May-19	25,000	0	25,000
17-May-19	79,500	500	80,000
18-May-19	95,500	4,500	100,000
19-May-19	77,100	7,900	85,000
20-May-19	20,300	2,200	22,500
21-May-19	30,000	7,500	37,500
22-May-19	63,900	11,100	75,000
23-May-19	39,500	8,000	47,500
24-May-19	72,000	13,000	85,000
25-May-19	84,200	13,300	97,500
26-May-19	68,000	14,500	82,500
27-May-19	58,700	16,300	75,000
28-May-19	55,300	37,200	92,500
29-May-19	46,700	49,300	96,000
30-May-19	20,600	19,400	40,000
GRAND TOTAL:	836,300	204,700	1,041,000

RECOMMENDATIONS

- I. To achieve the gaspereau escapement target (DFO operations):
 - Ensure staff are trained and in place to operate the FCF on the day that conditions and tailrace levels allow for safe operations. This includes 6-8 trained DFO staff being available for 3-4 weeks.
 - During the early run when Alewife percentages are still high, have full daylight hours of operation for 12 hours per day, seven days per week. This might include a rotation of teams or individuals to allow the required days of rest. A main truck and a spare truck should be available at the FCF during these hours of operation.
 - A scheduled crew of three staff per day (two of them as truck drivers) is most efficient, as it enables the production of 40 trips per day (approximately four trips per hour of operation). When just two staff are working, the driver is also working the FCF, which slows down loading. Production is then reduced to approximately three trips per hour of operation for a total of 32 trips per day for a 12 hour workday, or 24 trips per day for a 10 hour workday.

- II. To achieve the gaspereau escapement target (Mactaquac Fish Collection Facility Operations):
 - Ensure that NBP has the FCF operational by May 1st of every year. Alewife as a percentage of the gaspereau run, is the highest at the beginning of the season, as there is approximately a two week window before the Blueback Herring schools arrive. This period is critical for meeting the Alewife escapement target, and having an early season start date has historically

contributed to DFO's ability to meet minimum gaspereau escapement target quotas.

- Ensure that the FCF is operational for the duration of the season. Thorough and effective NBP maintenance of the FCF in the off-season is imperative, as breakdowns and maintenance during in-season operations can potentially make or break a season. Seasonal delays in opening the FCF due to maintenance issues have historically contributed to DFO's inability to meet minimum gaspereau escapement target quotas.
- Ensure that research activities do not interfere unnecessarily with FCF operations during gaspereau escapement season. In-season shutdowns jeopardize the goal of meeting minimum gaspereau escapement target quotas, because species percentage changes as the season progresses. If the number of gaspereau escapement fishing days is reduced due to interruptions in the FCF operations, there is a high risk that there will be insufficient time left to catch enough Alewives in order to meet the minimum escapement target of 800,000.