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St. Croix Anadromous Fisheries Program: 2011 Season Report

L. Sochasky
St. Croix International Waterway Commission
P.O. Box 610, Calais, ME 04619 *and* P. O. Box 2, St. Stephen, NB E3L 2W9

Summary

Alewives (*Alosa pseudoharengus*) and Atlantic salmon (*Salmo salar*) entering the St. Croix River, a boundary water between Maine and New Brunswick, have been recorded at the Milltown dam since the present fishway was opened in 1981. This head-of-tide dam is owned by the New Brunswick Power Corporation (NB Power). The fishway and research trap are on the Canadian side of the river and are under the jurisdiction of Canada's Department of Fisheries & Oceans (DFO).

Since 2007, the Milltown research trap has been operated solely for the May-July period that focuses on the alewife spawning run. The St. Croix International Waterway Commission (Commission) has conducted these assessments under agreements and/or partnerships with the U.S. Fish & Wildlife Service (USFWS), DFO, NB Power and the Maine Department of Marine Resources (DMR).

In 2011, the Milltown fishway and research trap were activated on May 9 when spring flows fell to levels that allowed for effective fishway operation. The research trap was operated continuously, with all fish counted individually, until July 11 when, based on the lack of alewife returns, it was lifted for the year.

After July 11, the fishway remained open to undocumented fish passage under management by NB Power.

A total of 25,142 alewives passed through the Milltown fishway during the nine weeks of monitoring in 2011. This was the second largest run since1999 – exceeded only by the previous year's return of 58,776 fish – and was more than double that of any run in the last 13 years except for 2010.

The general upward trend in run size is presumed to be due, in large part, to the availability of additional spawning habitat in Woodland Flowage since 2001. The smaller 2011 return, compared to 2010, may be due in part to an exceptionally small alewife run in 2007, which would have spawned many of the fish that returned this year.

No Atlantic salmon or other sea run fish were recorded at the trap in 2011, however three freshwater species were counted in small numbers.

Milltown fishway operation and trap counts

River flows above 5000 cubic feet per second (cfs) at the Milltown dam generate major standing waves across the river at the base of the dam and flood the lower end of the fishway, both of these minimizing fishway attraction and fish passage. For operating efficiency, these factors and the direct observation of fish below the dam have been used in recent years to determine the date that the fishway is activated.

With flows greater than 5000 cfs and no fish observed below the dam until May 9, the Milltown fishway and research trap were activated simultaneously on that date. The first alewife was passed on May 10.

The fishway trap was then operated continuously for nine weeks until, with only eight alewives passed in the last two weeks and none in the last six days, it was clear that the 2011 run had ended. [In only four of the last 31 years have any alewives entered the river after July 11, there being no more than three fish in any one year].

During this period, all fish were individually counted, this to ensure a complete record, before being released upstream. Table 1 gives these results.

The research trap was lifted for the year on July 11. NB Power continues to operate the fishway, without monitoring, until mid-fall annually.

River flows exceeded 5000 cfs for five days in the 2011 monitoring period (May 18-21 and 25) and trap records showed that this briefly delayed fish passage, with greater numbers of fish counted on days directly preceding and following these dates.

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Table 1. Inbound fish recorded at the research trap at the Milltown dam fishway, St. Croix River, May 9 - July 11, 2011.

Species	2011 trap count
Alewife/gaspereau	25,142
White sucker	19
Smallmouth bass	7
Brook trout	5

Alewife

Table 2 provides data on alewife returns to the St. Croix River from 1981 (the first year of recent record) to the present.

The 2011 run of 25,142 alewives was the second highest return since 1999, surpassed only by the exceptional return of 58,776 alewives in 2010. Both years warrant comment.

Last year's report suggested that the 2010 exceptional return may have been due, in part, to the cumulative effect of consecutive years of spawning success as a result of a Canadian trap-and-truck operation that partially restored access to alewife spawning habitat between the Woodland and Grand Falls dams, beginning in 2001. Subsequent scale aging data suggests this to be the case.

In 1995, the State of Maine blocked alewife access at the Woodland dam, based on determined adverse impacts to the area's recreational smallmouth bass fishery, which left less than 0.2% of the St. Croix's believed historic alewife spawning habitat available to this fish. A trap-and-truck operation by DFO in 2001-2007 and the State's reopening of the Woodland fishway to alewives starting in 2008 has given St. Croix alewives access to an additional 475 hectares (1174 acres) of spawning habitat in Woodland Flowage for the last decade. [Maine still maintains an alewife barrier at the Grand Falls dam, upstream, which blocks access to further spawning habitat.]

Compared to 2010, the lower return in 2011 may be due in part to the small size of the 2007 alewife run. Scale aging suggests that St. Croix alewife generally spawn first at Age 4 or 5. The 2007 alewife run that produced the Age 4 alewives returning in 2011 totaled just 1294 fish, compared to returns exceeding 10,000 fish in the immediately preceding and following years. The effect of the small 2007 run might also be felt in 2012, when Age 5 fish from this spawning will return for the first time.

Similar to recent years, the 2011 run tended to enter the fishway in concentrated bursts with two days, May 22 and 23, accounting for 52% of the run.

A total of 60 alewives were sampled between May 15 and July 5, to provide information for a long term database on St. Croix alewife length, weight, sex, gonad weight, sexual maturity and scale age. These data will be available at a later date as an addendum to this report.

Other species

Other fish captured in the Milltown trap during the course of alewife monitoring are counted and released upstream, unharmed.

In 2011, all were freshwater fish (see Table 1) that were assumed to have passed over the dam or through open gates and were returning up the fish ladder after encountering brackish water.

Fish health

No fish health studies were conducted in 2011.

Public information

Weekly reports of the alewife returns to Milltown in 2011were issued to 70 individuals and organizations by email, and to others by phone, from mid May to mid July. Additional requests for general or technical information were answered as received.

Acknowledgements

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Table 2. St. Croix River ME/NB alewife/gaspereau/blueback herring spawning runs, 1981- present

(bold = 7-day peak) Verified to July 11, 2011

Source: St. Croix International Waterway Commission and Fisheries & Oceans Canada

YEARS >>>	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
April 30-May2	0	0	0	0	0	5460	0	0	0	0	0	0	0	0	0
May 3-9	0	0	0	0	0	16410	9400	24410	0	29690	170	0	0	0	0
May 10-16	7510	32160	16970	6000	0	75150	171500	468750	0	305370	14740	8910	0	0	5898
May 17-23	47450	64120	**44050**	40300	70000	429400	559500	760280	200610	319380	133820	**74120**	12000	102210	**109388**
May 24-30	47770	**74800**	33760	**67100**	**149890**	**772800**	**674700**	**764990**	**464390**	**411090**	**154560**	45520	**146600**	116020	99847
May 31- June 6	**48310**	56930	20770	26200	96740	628300	645300	370750	424550	141490	51110	24780	102800	**144700**	0
June 7-13	16000	4610	35650	13300	26900	57200	480400	187800	63940	132030	4010	50420	2260	0	0
June 14-20	1760	250	620	0	21040	0	83900	13770	11370	0	0	0	26060	0	0
June 21-27	790	210	0	0	1060	0	0	0	0	0	0	0	0	0	0
June 28 - July 4	30	20	0	0	3270	0	0	0	0	0	0	0	0	0	0
July 5-11	0	1	130	0	0	0	0	0	0	0	0	0	0	0	0
July 12-18	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
July 19-25	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
July 26 - later			0	0	0	0	0	0	0	0	0	0	0	0	0
Spawning escapement	169620	233102	151952	152900	368900	1984720	2624700	2590750	1164860	1339050	358410	203750	289720	362930	215133
Harvest	0	0	0	0	0	0	0	0	0	192200	228500	0	8000	15400	8000
TOTAL RUN	169620	233102	151952	152900	368900	1984720	2624700	2590750	1164860	1531250	586910	203750	297720	378330	223133

YEARS >>>	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
April 30-May2	0	0	0	0	0	0	0	0	0	0	0	0	--	--	--	--
May 3-9	2814	0	0	0	**3966**	0	2	0	0	0	18	0	0	0	0	0
May 10-16	11178	0	**77394**	195	142	160	6	3	0	0	577	0	4	1	9748	1657
May 17-23	202188	**122478**	25705	5933	2011	505	23	603	0	2	3111	0	33	12	**17731**	**13053**
May 24-30	188538	93000	71534	**13615**	377	**2625**	325	2115	0	20	**3155**	2	119	3740	17008	1227
May 31- June 6	**231870**	4091	2684	5476	2067	1735	**494**	**3163**	0	5277	2540	0	**11797**	42	8520	7750
June 7-13	9390	5951	0	108	6	123	35	999	**951**	**6220**	1096	**1225**	61	2	4446	1387
June 14-20	0	0	0	0	0	54	15	1018	108	113	1227	66	23	**6627**	1126	50
June 21-27	0	0	0	0	0	0	0	0	79	0	105	1	221	26	140	10
June 28 - July 4	0	0	0	0	0	0	0	0	150	0	--	--	3	0	45	7
July 5-11	0	0	0	0	0	0	0	0	11	0	--	--	--	--	9	1
July 12-18	0	0	0	0	0	0	0	0	0	0	--	--	--	--	3	--
July 19-25	0	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--
July 26 - later	0	1	0	0	0	0	0	0	0	0	--	--	--	--	--	--
Spawning escapement	645978	225521	177317	25327	8569	5202	900	7901	1299	11632	11829	1294	12261	10450	58776	25142
Harvest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL RUN	645978	225521	177317	25327	8569	5202	900	7901	1299	11632	11829	1294	12261	10450	58776	25142

Note 1. Prior to 1999, alewife were enumerated by counting all fish for 10min/hr and multiplying by 6 to yield an hourly total, this done for each hour the fishway was open. In 1999 and 2000, "light" run periods were enumerated by shutting off the fishway exit for 4 hour intervals and then individually counting all fish in the trap, while "heavy" run periods were enumerated as in previous years. Since 2001, all fish have been counted individually.

Note 2. Beginning in 1995 the State of Maine blocked the upstream fishways at Woodland and Grand Falls to spawning alewives. In 2001, Fisheries & Oceans Canada began transporting a portion of the spawning run from Milltown to Woodland Flowage. Number of fish transported and released by year: 2001 (3756), 2002 (807), 2003 (6805), 2004 (392), 2005 (7100), 2006 (6653), 2007 (1169). In 2008, Maine removed the fishway barrier at Woodland, allowing alewives to directly enter the Woodland Flowage, and Fisheries & Oceans discontinued its trucking program.

Note 3. Monitoring was discontinued on June 27 in 2006-2007, July 3 in 2008, July 4 in 2009, July 19 in 2010 and July 11 in 2011 at the presumed end of the run; any fish entering after these dates are unrecorded