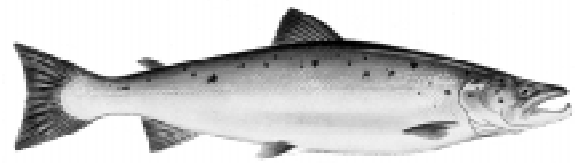
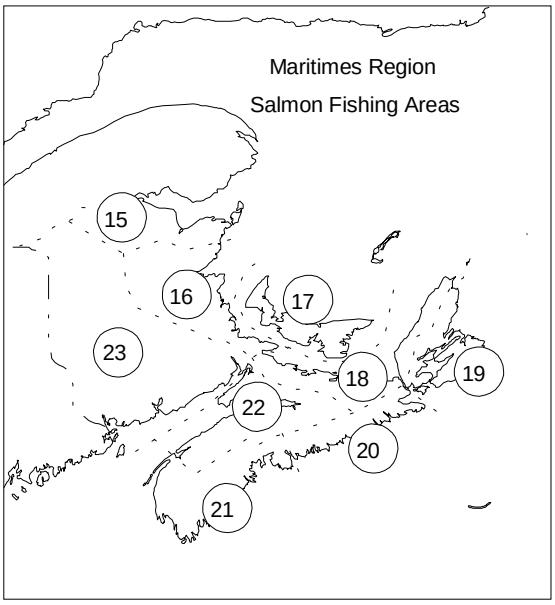


Atlantic Salmon Maritimes Region Overview

Background

There are nine Atlantic salmon (Salmo salar) management areas known as Salmon Fishing Areas (SFA) in the Maritimes Region of eastern Canada. There are more than 150 rivers within the Maritimes for which Atlantic salmon catches have been reported. Each river is assumed to consist of at least one stock with the larger rivers containing several stocks. There is a diverse life history structure including variations in freshwater residence time, age at maturity and the extent of ocean migrations. Spawning populations consist of varying proportions of small salmon (fork length <63 cm) and large salmon (fork length ≥63 cm). In the majority of rivers, small salmon are predominantly maiden fish (never spawned before) which have spent one year at sea before returning to spawn (one-sea-winter salmon). The large salmon component contains a mixture of maiden fish which have spent two and occasionally three years at sea before spawning and previous spawners which are returning for a second or subsequent spawning. The majority of the large salmon maiden spawners are female. The relative proportions of the size groups in the returns vary geographically Conservation for Atlantic salmon is considered to be a threshold reference point. The consequences of egg depositions below conservation to the long-term sustainability of the stock are unknown but the likelihood of deleterious effects are greater when egg depositions are below conservation. The conservation requirements are established for individual rivers based on 2.4 eggs per m^2 of river habitat. In rivers impacted by airborne acid depositions, the conservation requirements are under review.

The status of the stocks is assessed on the basis of the proportion of the conservation egg deposition achieved in a given year and the trends in abundance of various life stages.

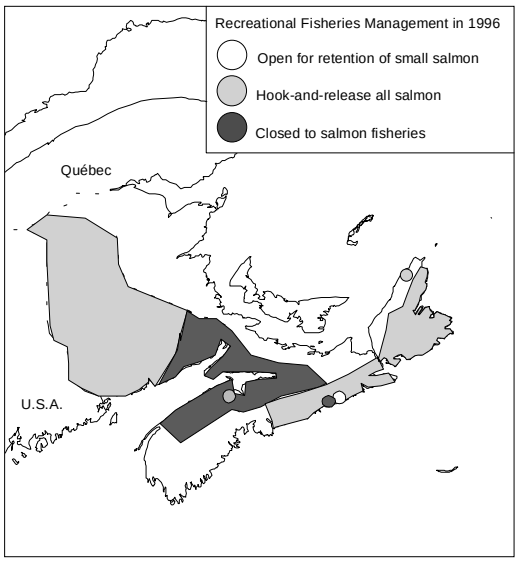


The Fishery

Atlantic salmon were harvested by two user groups: Aboriginal communities and recreational fishers. Aboriginal communities were given first access to salmon (after conservation requirements) based on communal needs for food, social and ceremonial purposes. Aboriginal fisheries occurred throughout the Maritimes Region in accordance with agreements and communal fishing licenses. Several Aboriginal communities chose not to exercise their right to the communal allocations because of conservation considerations.

Recreational fisheries management in 1996 consisted of three strategies: 1) regular retention fisheries for small salmon with mandatory hook-and-release for large salmon, 2) hook-and-release of all salmon

regardless of size reflecting reduced stock levels, and 3) complete closure reflecting depressed stock levels. A large proportion of the rivers in Nova Scotia was closed to angling or was under hook-and-release management in 1996.



Other management measures in effect in 1996 which potentially affected the salmon stocks from the Maritimes Region include the fifth year of the commercial salmon moratorium for insular Newfoundland and the re-initiation of the Greenland fishery in August of 1995 which would have intercepted salmon destined to return to the Maritimes Region as large salmon in 1996.

In those areas where retention angling fisheries or hook-and-release fisheries were in effect, the impression from anglers was of high abundance of salmon in 1996. End-of-season assessments of returns indicated that throughout the Maritimes, good angling opportunities were the result of water conditions and generally early arrival of salmon into the rivers. These conditions promoted the distribution and availability of fish to anglers early in the year.

Harvests (by all users) in 1996 were unchanged or declined relative to harvests since 1984. Reduced harvests in 1996 were a consequence of the more restrictive management regime as well as declines in abundance of salmon in the Maritimes Region. Harvests increased in only one assessed river, River Philip on the Northumberland Strait shore of Nova Scotia (Table 1).

Resource Status

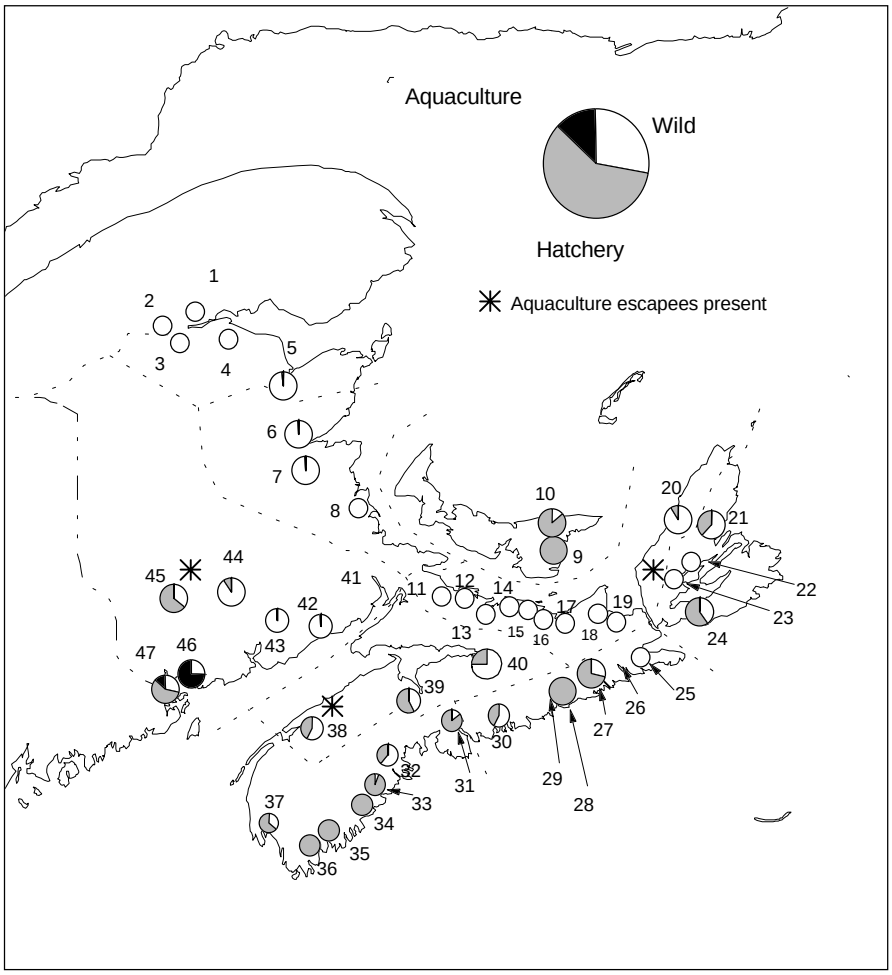
Information was presented for 47 Atlantic salmon rivers of the Maritimes Region. Returns and spawning escapements of Atlantic salmon in 1996 were assessed for 38 of these rivers (Table 1). Escapements are the differences between returns and total removals (including Aboriginal community harvests, angling harvest, mortalities associated with hook-and-release angling of 3% to 10% of the released catch depending upon the river, and broodstock collections). Egg depositions were estimated from the biological characteristics of the adults. In numerous rivers, hatchery progeny were identified on the basis of marks (generally a clipped adipose fin), fin deformities, and scale characteristics. Aquaculture escapees were identified on the basis of body morphology, fin deformities and scale characteristics.

Various techniques were used to assess the returns and spawning escapement to individual rivers: 10 rivers using angling catches and assumed exploitation rates (Ang), one river based on broodstock seining success rate (Br), one river using a catch rate index (CR), four rivers using counting fences (Fe), nine rivers using counts at fishways (Fw), five rivers using mark and recapture experiments (MR), one river using a relative index from a neighbouring assessed river

(Rel), one river using shore counts (Sh), one river using snorkel counts (Vi) and five rivers using snorkel counts with a mark and recapture calibration (ViM).

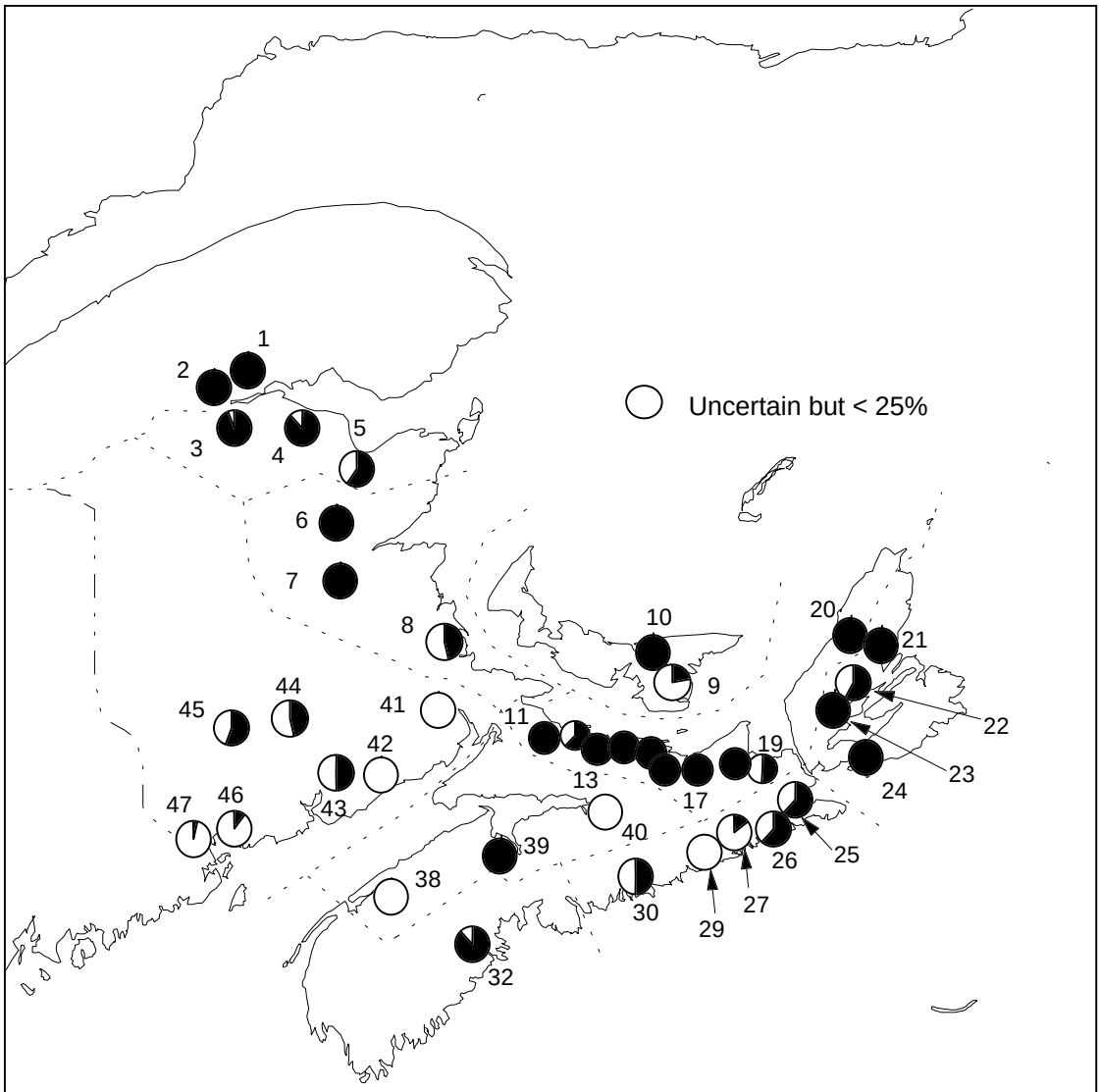
Origin of Returns

Fish of hatchery origin made up varying proportions of the returns to rivers. Wild salmon (defined as returns from eggs spawned naturally in the gravel) represented more than 95% of the returns in most of the rivers from the southern Gulf of St. Lawrence with the exception of rivers in Prince Edward Island (PEI) where hatchery origin fish comprised more than 90% of the returns. Returns to rivers of the Atlantic coast of Nova Scotia (NS) were composed of varying proportions of wild and hatchery origin fish. All the returns to five acid-impacted rivers of NS were hatchery origin. Aquaculture escapees were observed in significant proportions in two rivers of the outer Bay of Fundy, New Brunswick (NB); these rivers are in close proximity to the aquaculture production centre. Escapees were also observed in the Saint John River at Mactaquac (Index 45), Annapolis River (outer Bay of Fundy, NS, Index 38), and in Middle River (Bras d'Or Lake, Cape Breton, NS, Index 23).



Escapements relative to conservation

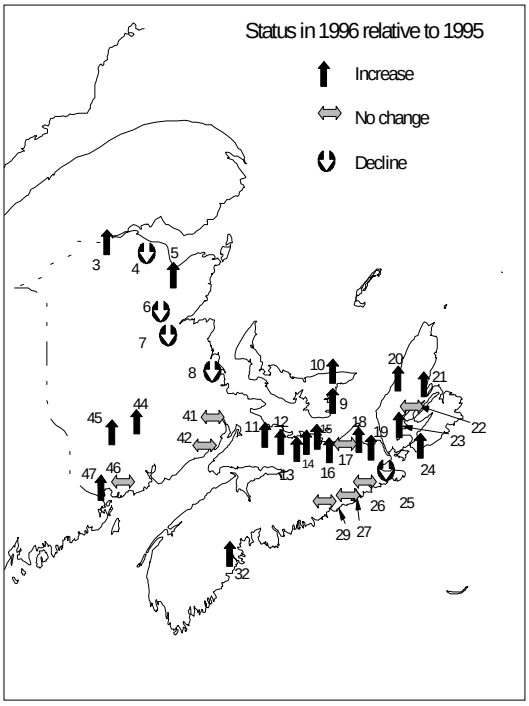
Egg depositions relative to the conservation requirements were met or exceeded in 15 of the 38 rivers (39%) assessed in 1996. Conservation requirements were met or exceeded in 11 of 18 rivers (61%) assessed in the southern Gulf of St. Lawrence. Only 30% of the ten rivers assessed for the Atlantic coast of NS met or exceeded the conservation requirements whereas 10% of the ten rivers of the Bay of Fundy met or exceeded conservation (Table 1). Six of the 10 Bay of Fundy rivers had escapements which were estimated to have been less than 25% of conservation requirements.



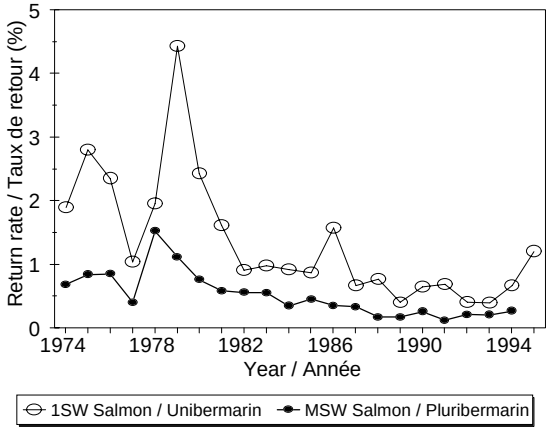
Egg deposition (black) as the proportion of the conservation requirement

Trends in returns and escapements

Returns and escapements in 1996 were generally improved from 1995 throughout the Maritimes Region. Declines relative to 1995 were observed in the Jacquet River (Index 4; SFA 15), Miramichi and Buctouche rivers (Index 6 to 8; SFA 16), and the Salmon River (Index 25; SFA 20).



There were significant declines in status (annual returns and escapements) since 1984 in all SFAs with the exception of the Northumberland Strait rivers of Nova Scotia (SFA 18) where the status was generally unchanged (Table 1). The status of the Miramichi River has improved since 1984 but in the last five years, returns have declined in both of the main branches and overall. The status of the Saint John River (above Mactaquac) resource is declining in terms of both returns and spawning escapements of wild salmon. The sea survival of the 1995 hatchery smolt run was the second highest observed since 1982 but was lower than the peak survivals observed in the late 1970's. Increased return rates in 1996 from hatchery smolts were also observed in the Liscomb River and LaHave River.

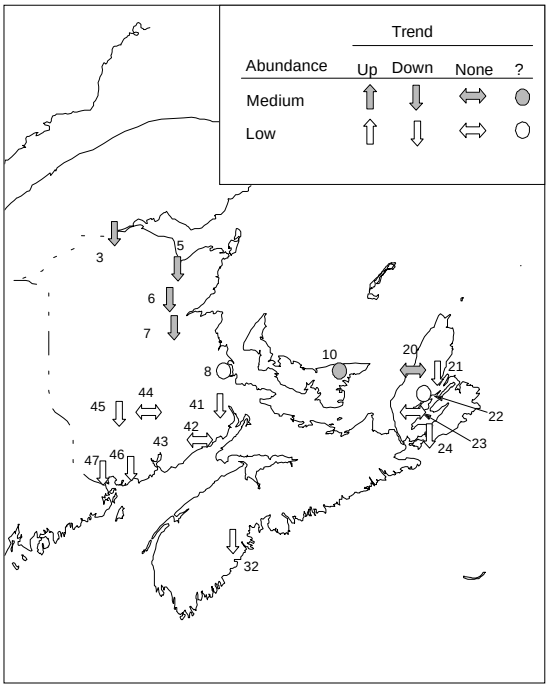


Smolt return rate (by year of smolt stocking) to 1SW and MSW salmon returns to the Mactaquac facility of the Saint John River.

General abundance of adult salmon

In none of the rivers in the Maritimes Region was the abundance of wild salmon considered to be high relative to historical or expected levels of production.

Wild salmon in the rivers of the southern Gulf of St. Lawrence (SFA 15, 16 and 18) are considered to be at medium levels of abundance whereas their levels in Atlantic coast and Bay of Fundy rivers are currently low. As well, in all the rivers with appropriate time series of abundance values, the annual trend in abundance of wild salmon since 1984 is consistently downward or unchanged.



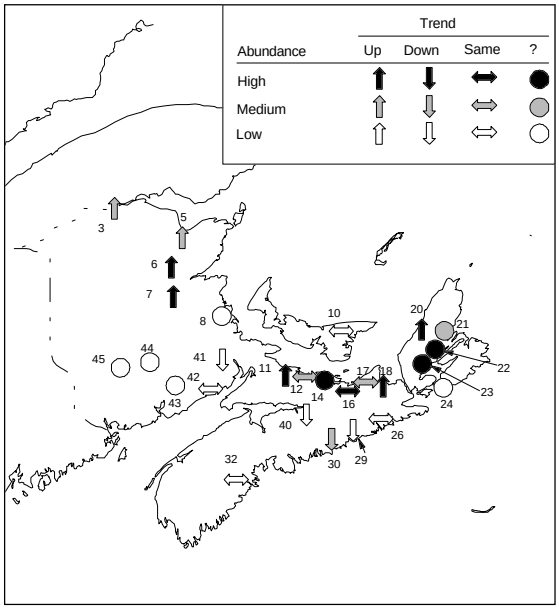
Relative abundance and trends in abundance of wild adult salmon.

The absence of an increasing trend in abundance of wild salmon in any river of the Maritimes Region is contradictory to the expectations of the effects of the closure of the commercial fisheries in the Maritimes in 1984, the closure of the insular Newfoundland commercial fishery in 1992 and the reduced harvests in the Greenland fishery in the 1990's.

Adult salmon of hatchery origin are considered to be at low to medium levels of historical abundance in most rivers except for two rivers in Cape Breton (NS) and in the Saint John River (above Mactaquac) (Table 1). In the Saint John River (above Mactaquac), 80% of the 1SW salmon and 30% of the MSW salmon returning to Mactaquac in 1996 were considered to be of hatchery origin (smolt stocking or juvenile stocking in tributaries). These represent the highest proportion ever; the 1995 proportions were 57% hatchery origin for 1SW salmon and 27% for MSW salmon.

General abundance of juveniles

Although the abundance of adult salmon has remained at low to medium levels, the juvenile abundances in several rivers of the Maritimes have responded to increased spawning escapement since 1984. The abundance of juveniles (measured as number of fish per area of habitat) was high in the Miramichi (SFA 16), in several rivers of the Northumberland Strait shore of Nova Scotia (SFA 18) and in rivers of Cape Breton Island (SFA 18 and 19) (Table 1).



Relative abundance and trends in abundance of juvenile Atlantic salmon.

In southern Gulf of St. Lawrence rivers, the juvenile abundances were considered to be increasing or unchanged over time and none of the rivers had decreasing levels of abundance. This contrasts with the pattern in the Atlantic coast of Nova Scotia and Bay of Fundy rivers where abundance of juveniles was generally considered to be low. In three of the five rivers with information, there was

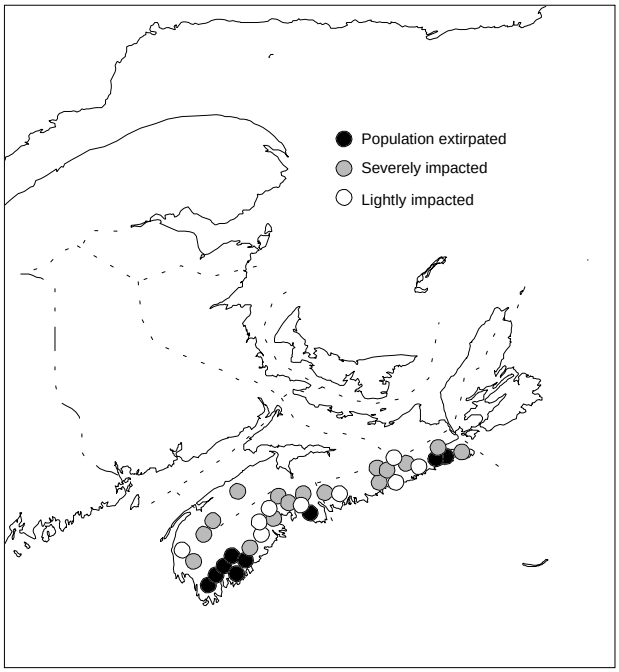
additionally a declining trend in abundance (Table 1).

Environmental Considerations

Freshwater environmental conditions affect the timing and availability of salmon to the fisheries. Discharges in 1996 were above normal in both winter and summer with no important low flow events. This contrasts with the 1995 water levels when summer flow conditions were exceptionally low. Warm water temperatures in 1996 were not as extreme as in the two previous years. Above-normal discharges and cooler water temperatures provided excellent angling opportunities in those areas where fisheries were open.

Marine conditions were more temperate in 1996 relative to those of the preceding several years (1990 to 1995). Ice coverage in the winter of 1996 was below the median distribution and ice retreat was earlier in the spring of 1996 than in previous years. This earlier ice retreat could in part account for the earlier run-timing of salmon to most areas of the Maritimes. Colder oceanic conditions both nearshore and in the Labrador Sea are negatively associated with marine survival of salmon in eastern Canada. Environmental conditions tend to be autocorrelated and the upward trend in warming of the water temperatures in 1994 to 1996 may represent the return to temperate marine conditions favouring salmon production.

The Southern Upland (Atlantic Coast) area of Nova Scotia is impacted by acid rain. This region is particularly sensitive because of a combination of hard rock geology, poor soils and prevailing weather patterns that cause much of the atmospheric pollution from the US industry to precipitate over the Maritimes. Of the sixty Atlantic salmon rivers along the Atlantic coast of Nova Scotia, salmon runs have been extirpated in 14 rivers (mean annual pH <4.7), severely impacted in 20 rivers (mean annual pH 4.7 to 5.0) and lightly impacted in 16 rivers (mean annual pH 5.1 to 5.4). Thirteen rivers in this area do not have acid toxicity constraints (pH > 5.4) because of a higher acid neutralizing capacity. Sulphate levels show a significant decline during the 1981 to 1995 period. The decline in sulphate emission/deposition should become more pronounced over the next 5 to 10 years with the anticipation of a return to less toxic salmon habitat.



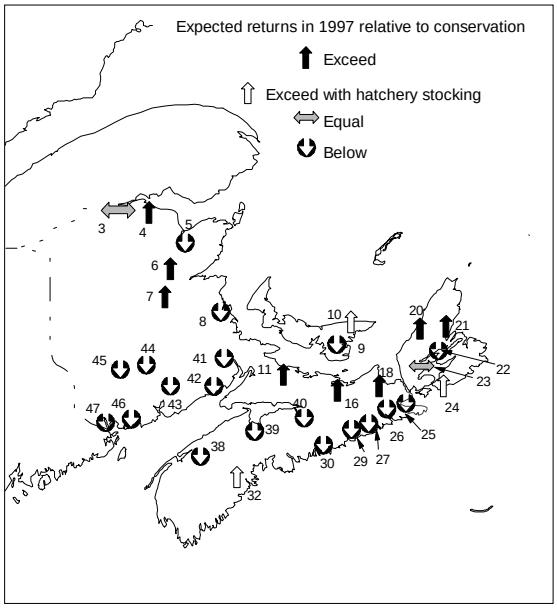
Distribution of acid-impacted rivers in Nova Scotia.

Outlook

Short term

Expectations of returns for 1997 are based on a combination of methods: use of the previous 5-year average returns, forecast

models based on small salmon returns in the current year to predict large salmon returns in the coming year, stock-and-recruitment relationships, and trends in survival rates of juveniles and smolts from hatchery stocking combined with stocking levels in previous years. The performance of these methods varies. Some have produced accurate predictions (for example the large salmon returns to Mactaquac on the Saint John River) while for others, the previous 5-year average would have produced an equally appropriate prediction (for example large salmon returns to the Miramichi River). Expectations for 1997 are described in terms of whether the total returns of salmon (small and large) will be below, meet, or exceed the conservation egg requirements for the river (Table 1).



The returns of wild salmon in 1997 to rivers of the southern Gulf of St. Lawrence are expected to meet or exceed the conservation egg requirements except for three rivers that have recently been underseeded (Nepisiguit:5, Buctouche:8, and Valley-field:9).

Returns of salmon (wild and hatchery origin) to rivers of the Atlantic Coast of Nova Scotia are not expected to meet or exceed the conservation requirements. Exceptions are the North, Middle and Grand rivers in Cape Breton Island where for Grand River, hatchery origin salmon are expected to contribute to returns in excess of conservation (Table 1). In the LaHave River, total returns of wild salmon are not expected to meet or exceed the interim conservation level but returns of wild and hatchery origin salmon are expected to exceed the conservation requirement.

Returns of all salmon (wild and hatchery origin) to the Bay of Fundy rivers are expected to be below the levels required to meet the conservation egg requirements.

Long term

The long term prospects for Atlantic salmon stocks of the Maritimes Region can be categorized geographically. In the southern Gulf of St. Lawrence, the abundance of wild salmon is at best at medium levels relative to historical or expected values. The juvenile abundance in the rivers are at medium to high levels and generally increasing over time. Juvenile abundance is high in these rivers for two reasons: 1) they have a high proportion of large salmon in the returns (produce large quantities of eggs), 2) a large portion of the run returns late in the season and are not as heavily exploited as early-run fish, especially in the homewater fisheries. High juvenile abundances have not translated into high adult returns to date. The ocean environment appears to be an important factor in the low at-sea survivals of Atlantic salmon in eastern Canada because returns to rivers have not increased markedly following closure of fisheries in Newfoundland and reduced fisheries in Greenland. When sea survivals improve, the abundance of salmon is expected to increase above current levels.

Atlantic salmon stocks from Prince Edward Island depend upon hatchery stocking for the large share of the returns. The wild salmon populations are suspected of being negatively affected by land use practices (agriculture and roads) which results in excessive instream siltation and contamination.

Most Atlantic salmon stocks of the Atlantic Coast of Nova Scotia and the Bay of Fundy are not expected to show any important improvements over the next five years. The abundance of wild adult salmon and juveniles is generally low and declining. Sea survival of the salmon from the inner Bay of Fundy stocks is the most important constraint. Returns of wild adult salmon which will meet the conservation requirements are not anticipated in the near future. Returns of hatchery origin salmon may produce returns which approach or even meet the conservation requirements but the long term sustainability of the hatchery initiative is uncertain (from logistic and biological standpoints). The populations of salmon in this area are also impacted by numerous industrial activities: acid rain deposition, fish passage constraints (upstream and downstream), water use practices (regulation of discharge asynchronous with seasonal movements of fish) and escapees from aquaculture facilities.

Management Considerations

A precautionary management approach is advisable for many of the Atlantic Salmon stocks of the Maritimes. The precautionary approach considers the relative uncertainty of the assessment and management practices. Under this approach there should be no increase, and preferably a decrease, in the level of exploitation, thereby minimizing the risk of not achieving the conservation threshold.

For the rivers of the southern Gulf of St. Lawrence, exploitation levels similar to those of 1996 are not expected to reduce the escapements below conservation requirements. The exceptions are the Nepisiguit and Buctouche rivers, and possibly the Restigouche River. Returns to the Nepisiguit and Buctouche rivers are expected to be below conservation. On the Restigouche River, the continuing exploitation of large salmon by the Aboriginal communities and in the Québec recreational fishery have combined to reduce egg depositions to below or at the required conservation level in five of the last seven years. For these three rivers a precautionary management approach is advised, particularly pertaining to large salmon.

For the Atlantic coast of Nova Scotia and the Bay of Fundy, no surplus to conservation of wild salmon is anticipated in 1997 with the possible exceptions of North and Middle rivers, Cape Breton. Returns of hatchery origin salmon to some rivers in this area (e.g., LaHave, Main Saint John and above Mactaquac) are expected to provide a harvestable surplus of small salmon. The populations of several rivers along the southern and eastern shores of Nova Scotia have been extirpated and returns to these rivers are exclusively the result of hatchery stocking. In these rivers, there are no conservation concerns relative to exploitation since there are no wild populations of salmon. No change is evident in the downward spiral of the 36 Inner Bay of Fundy stocks (e.g., Big Salmon, Stewiacke) which are at critical levels as result of exceptionally low sea survival.

For more Information:

Contact: John Ritter
Science Branch
Dept. of Fisheries and Oceans
P.O. Box 5030
Moncton, N.B.
E1C 9B6

Tel: 506 851 2945
Fax:506 851 2147
E-Mail:RitterJ@GFC.DFO.CA

References

CSAS 1997. Atlantic Salmon Chaleur Bay SFA 15. DFO Science Stock Status Report D3-01.

CSAS 1997. Atlantic Salmon Miramichi & Buctouche Rivers SFA 16. DFO Science Stock Status Report D3-05.

CSAS 1997. Atlantic Salmon Prince Edward Island SFA 17. DFO Science Stock Status Report D3-07.

CSAS 1997. Atlantic Salmon Northumberland Strait Nova Scotia part of SFA 18. DFO Science Stock Status Report D3-08.

CSAS 1997. Atlantic Salmon Cape Breton SFA 18 (part) and SFA 19. DFO Science Stock Status Report D3-09.

CSAS 1997. Atlantic Salmon Eastern Shore Nova Scotia SFA 20. DFO Science Stock Status Report D3-10.

CSAS 1997. Atlantic Salmon Southern Nova Scotia SFA 21. DFO Science Stock Status Report D3-11.

CSAS 1997. Atlantic Salmon Inner Bay of Fundy SFA 22 and part of SFA 23. DFO Science Stock Status Report D3-12.

CSAS 1997. Atlantic Salmon Southwest New Brunswick outer Fundy SFA 23. DFO Science Stock Status Report D3-13.

Watt, W. 1997. The Atlantic Region Acid Rain Monitoring Program in Acidified Atlantic Salmon Rivers: Trends and Present Status. DFO Canadian Stock Assessment Secretariat Research Document 97/28.

This report is available from the:

Maritimes Regional Advisory Process
Department of Fisheries and Oceans
P.O. Box 1006, Stn. B105
Dartmouth, Nova Scotia
Canada B2Y 4A2
Phone number: 902-426-7070
e-mail address: v_myra@bionet.bio.dfo.ca

Internet address: http://csas.meds.dfo.ca

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

Table 1. Summary of status of Atlantic salmon stocks in the Maritimes Region rivers in 1996.

River	SFA	Method	Map Index	Harvests		Conservation met?		Abundance			Status		Returns relative to conservation in 1997	Constraints
								Juveniles	Adults		1996 rel.	1984 to		
				Small	Large	1996	84 to 95		Wild	Hatchery	1995	1995		
Matapedia	Q1	Vi	1			Yes	1 of 12 ⇧							
Patapedia	Q1	Vi	2			Yes	9 of 12 ⇔							
Restigouche	15	Ang	3	3481 🡻	2368 🡻	No	7 of 12 🡻	Med ⇧	Med 🡻		⇧	🡻	⇔	
Jacquet	15	Fe	4	67	2	No	2 of 2				🡻	🡻	⇧	
Nepisiguit	15	Ang	5	534 🡻	41 ⇔	No	2 of 12 🡻	Med ⇧	Med 🡻	Low 🡻	⇧	⇔	🡻	
Miramichi	16			19565⇔	702 🡻	Yes	10 of 12 ⇧	High ⇧	Med⇔	Low ⇔	🡻	⇧	⇧	
Northwest Miramichi	16	MR	6	7153 ⇔	380 🡻	Yes	3 of 3	High ⇧	Med 🡻	Low ⇔	🡻	🡻	⇧	
Southwest Miramichi	16	MR	7	12341 🡻	196 ⇔	Yes	3 of 3	High ⇧	Med.🡻	Low ⇔	🡻	🡻	⇧	
Buctouche	16	MR	8	44	5	No	0 of 3	Low	Low		🡻	🡻	🡻	
Valleyfield	17	Fe	9	18	0 ⇔	No	0 of 6			Low	⇧	⇧	🡻	LU
Morell	17	Fw	10	446 ⇔	0 ⇔	Yes	9 of 12	Low ⇔	Med	Med ⇔	⇧	⇔	⇧	LU

Assessment methods:

Ang = angling catches and assumed exploitation rates
Br = index based on broodstock seining success
CR = catch rate index
Fe = counting fence
Fw = fishway
MR = mark and recapture experiment
Rel = relative to neighbouring index river
Sh = shore count
Vi = snorkel count
ViM = snorkel count and mark/recapture calibration

Trend symbols:

🡻 = decline
⇔ = no change
⇧ = increase

Returns relative to conservation in 1997:

🡻 = below conservation
⇔ = meet conservation
⇧ = exceed conservation

Constraints

Ac = acid impacted rivers
LU = land use practices
AQ = aquaculutre escapees
WU = water use practices
Fp = fish passage constraints

Table 1 (continued).

River	SFA	Method	Map Index	Harvests		Conservation met?		Abundance			Status		Returns relative to conservation in 1997	Constraints
								Juveniles	Adults		1996 rel.	1984 to		
				Small	Large	1996	84 to 95		Wild	Hatchery	1995	1995		
R. Philip	18	ViM	11	175 ⇧	30 ⇧	Yes	5 of 6	High ⇧			⇧	⇔	⇧	
Wallace	18	Ang	12	20 ⇔	5 ⇔	No	0 of 2	Med ⇔			⇧			
Waugh	18	Ang	13	26	7	Yes	1 of 1				⇧			
R. John	18	Ang	14	21	6	Yes	1 of 2	High			⇧			
West (Pictou)	18	Ang	15	63	10	Yes	1 of 1				⇧			
East (Pictou)	18	ViM	16	33	14	Yes	4 of 6	High ⇔			⇧	🡻	⇧	
Sutherlands	18	Vi	17	0	0	Yes	2 of 2	Med ⇔			⇔			
West (Ant.)	18	Ang	18	125	25	Yes	3 of 6	High ⇧			⇧	⇔	⇧	
South	18	Ang	19	12	1	No	0 of 1				⇧			
Margaree	18	MR	20	271 ⇔	89 ⇔	Yes	11 of 12 ⇔	High ⇧	Med ⇔	Low ⇔	⇧	⇔	⇧	
North	19	ViM	21	0 🡻	1 ⇔	Yes	11 of 12 ⇔	Med	Low 🡻	High ⇧	⇧	⇔	⇧	
Baddeck	19	ViM	22	0 ⇔	0 ⇔	No	0 of 2	High	Low		⇔			🡻
Middle	19	ViM	23	8 ⇔	15 ⇔	Yes	2 of 7 ⇔	High	Low ⇔		⇧	⇔	⇔	
Grand	19	Fw	24	0 🡻	0 ⇔	Yes	5 of 8 🡻	Low	Low 🡻	High ⇧	⇧	🡻	⇧	Fp
Salmon	20	Ang	25	14 ⇔	6 ⇔	No	0 of 1				🡻			🡻
St. Mary's	20	Ang	26	40 🡻	15 🡻	No	0 of 3	Low ⇔			⇔	🡻	🡻	Ac
Liscomb	20	Fw	27	0 🡻	0 🡻	No	1 of 12				⇔	🡻	🡻	Ac
East S.H.	20		28	21	0	N/A								Fp
West S.H.	20	Rel	29	**Closed**	**Closed**	No	0 of 3	Low 🡻			⇔		🡻	Ac
Musquodoboit	20	MR	30	23 🡻	11 🡻	No	0 of 1	Med 🡻						🡻

Assessment methods:

Ang = angling catches and assumed exploitation rates
Fw = fishway
MR = mark and recapture experiment
Rel = relative to neighbouring index river
Vi = snorkel count
ViM = snorkel count and mark/recaputre calibration

Trend symbols:

🡻 = decline
⇔ = no change
⇧ = increase

Returns relative to conservation in 1997:

🡻 = below conservation
⇔ = meet conservation
⇧ = exceed conservation

Constraints

Ac = acid impacted rivers
Fp = fish pasage constraints

Table 1 (continued).

River	SFA	Method	Map Index	Harvests		Conservation met?		Abundance			Status		Returns relative to conservation in 1997	Constraints
								Juveniles	Adults		1996 rel.	1984 to		
				Small	Large	1996	84 to 95		Wild	Hatchery	1995	1995		
Sackville	21		31											
LaHave	21	Fw	32	1351	0	No	8 of 12 ↓	Low ⇔	Low ↓	⇔	⇧	↓	⇧	Ac
Medway	21		33											
Mersey	21		34	429	?	N/A	N/A		N/A	⇔				Ac
Jordan	21		35	0	0	N/A	N/A		N/A	⇔				Ac Fp
Clyde	21		36	50	0	N/A	N/A		N/A	⇔				Ac
Tusket	21		37											
Annapolis	22	Br	38	**Closed**	**Closed**	No							↓	Fp
Gaspereau	22	Fw	39	0	0	Yes	1 of 2						↓	WU
Stewiacke	22	CR	40	**Closed**	**Closed**	Unk	0 of 3	Low ↓					↓	
Petitcodiac	23	Fw	41	**Closed**	**Closed**	No	0 of 7 ↓	Low ↓	Low ↓	Low ↓	⇔	⇔	↓	Fp
Big Salmon	23	Sh	42	**Closed**	**Closed**	No	1 of 7 ⇔	Low ⇔	Low⇔		⇔	⇔	↓	
Kennebecasis	23	Fe	43	0 ↓	0 ⇔	No		Low/Med		Low ⇔				↓	
Nashwaak	23	Fe	44	0 ↓	0 ⇔	No	0 of 3	Low	Low⇔	Low ⇔	⇧	⇔	↓	
Saint John (above Mactaquac)	23	Fw	45	967 ↓	368 ↓	No	2 of 12 ↓	Low	Low ↓	High ⇔	⇧	↓	↓	Fp WU
Magaguadavic	23	Fw	46	0 ↓	0 ⇔	No	3 of 7 ↓		Low ↓	Med ⇧	⇔	↓	↓	AQ WU
St. Croix	23	Fw	47	0 ↓	0 ⇔	No	0 of 11 ↓		Low ↓	Med ⇔	⇧	↓	↓	AQ Fp WU

Assessment methods:

Br = index based on broodstock seining success
CR = catch rate index
Fe = counting fence
Fw = fishway
Sh = shore count

Trend symbols:

↓ = decline
⇔ = no change
⇧ = increase

Returns relative to conservation in 1997:

↓ = below conservation
⇔ = meet conservation
⇧ = exceed conservation

Constraints

Ac = acid impacted rivers
AQ = aquaculutre escapees
Fp = fish passage constraints
WU = water use practices