

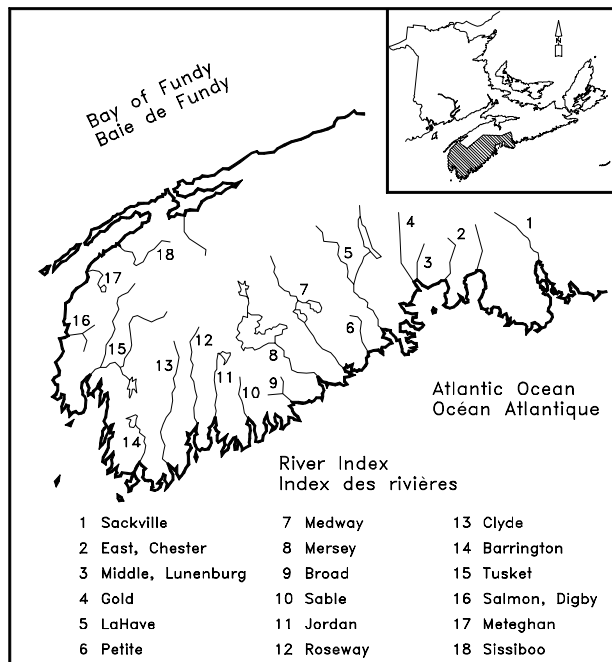
Atlantic Salmon Southern Nova Scotia SFA 21

Background

Atlantic salmon (*Salmo salar*) utilize both freshwater and the ocean for their life cycle. Salmon spawn in freshwater, grow to smolts in two to three years, migrate to the sea, mature and return to their natal river to complete the cycle. Variations in duration spent at these stages occur among stocks and generations. Salmon stocks in SFA 21 are generally composed of fish that mature after one (grilse) and two (two sea-winter salmon) winters at sea. In these rivers egg deposition is contributed in equal portions by large salmon and grilse. Large salmon have about 1.5 times more eggs per fish than do grilse.

Rivers along the southcoast of Nova Scotia occupy a geological area known as the Southern Upland zone. Rivers in this zone are affected to varying degrees by acid rain and have been classified into four categories based on average annual pH: I) rivers in which acid toxicity precludes natural sustainability of salmon, II) rivers in which salmon stocks are highly impacted by acidification and salmon are remnant, III) rivers which are partially impacted by acidification and salmon persist, and IV) rivers which are minimally impacted by acidification. Salmon stocks are known to have been lost in eight rivers, remnant in eight, impacted in four, and minimally impacted in three. Due to the range of acidification and the uncertainty of using standard methods conservation requirements are undefined for many rivers of SFA 21.

Stocking of hatchery smolts is widespread throughout SFA 21. Salmon angling effort remained high in six rivers and occurred in eleven other rivers in 1997. Three rivers are acid impacted and toxic to juvenile



salmon. These rivers are stocked with hatchery smolts to provide fisheries for returning adults.

Harvests of fish ≥ 63.0 cm (large salmon) have been restricted since 1984. Management of escapement is by allocation of fish < 63.0 cm (small salmon).

Complete counts and biological data have been available since 1972 at Morgan Falls fishway on the LaHave River. The conservation requirement above Morgan falls is 1.96×10^6 eggs. Morgan Falls fishway is the principal site for assessment of the status of salmon stocks of SFA 21 and SFA 20. In-season assessment of the annual return of salmon can be evaluated at this site June 15 and July 6.

Summary

- Rivers are impacted by acidification and have a wide range of losses to production.
- Wild salmon are not expected to meet conservation requirements in any of the rivers in SFA 21 in 1998.
- Hatchery returns may contribute to some surpluses in 1998.

The Fishery

Harvests by First Nations and other Aboriginal Peoples in SFA 21 during 1997 were 72 grilse.

As in previous years, commercial fisheries were closed and by-catch of salmon in other local fisheries was prohibited.

The recreational fishery opened May 10 and closed by variation order on July 11 in all rivers of SFA 21 except the Clyde, Jordan Metaghan and Mersey rivers where the fishery closed effective October 1. Only small salmon were permitted to be retained in the recreational fishery. Retention on the LaHave River began June 1. Retention of grilse was permitted throughout their extended seasons on the Clyde, Jordan and Mersey rivers. The daily bag limit for retention of small salmon in SFA 21 was one fish.

Angling effort decreased to 7,705 rod days in 1997, a 58% reduction from 1996. Estimated angling catch was 780 retained and 123 small salmon released, a 66% decrease from 1996. The estimated release of 319 large salmon represents a 50% decrease from 1996. Effort, number of small salmon retained and numbers of small and large salmon released, were all less than the 1991 to 1996 mean values.

LaHave, Medway and Gold rivers provided 74% of the SFA 21 catch in 1997. These category III rivers have significant areas of non-acidified water, average main river pH's above 5.1 and are supported by hatchery stocking.

Aboriginal and recreational catches in category I rivers, which make up 15% of the salmon production area of SFA 21,

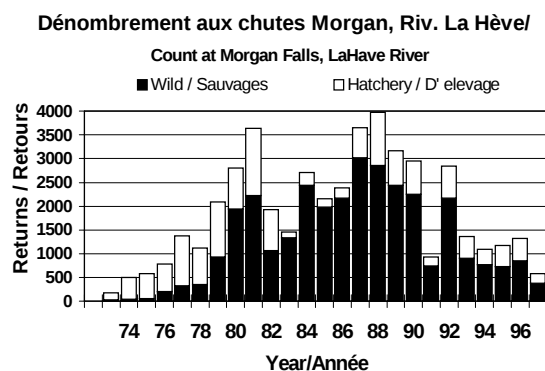
accounted for 5% of the reported catch. All catches for category I rivers came from the Clyde River and were of hatchery origin. Category II rivers comprise 30% of the production area but accounted for only 5% of the reported catch. Category III rivers have 50% of the production area and 74% of the catch. Category IV makes up 5% of the area and accounted for 17% of the reported catch.

Resource Status

Stock status relative to conservation is difficult to assess for the rivers in SFA 21. Almost all of rivers are acid impacted to some extent. Conservation requirements for most of these rivers have yet to be defined. Water chemistry data collected from four additional rivers in SFA 21 in 1997, will enable more river specific conservation requirements to be derived for future assessments.

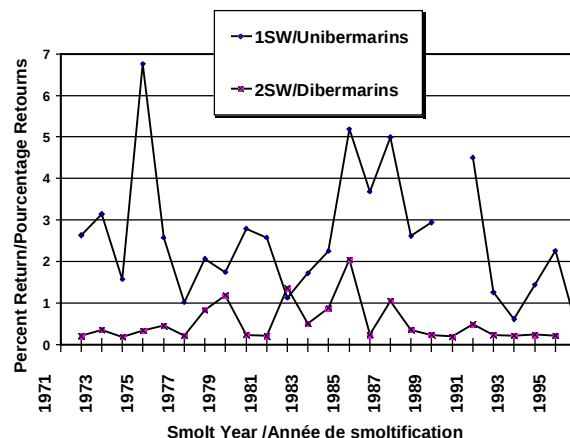
The status of the stock above Morgan Falls on the LaHave River is used as an index of the status of the stocks in SFA 21. This section of the LaHave River is only partially impacted by acidity (3.3% of the habitat area) and, like the other major salmon producing rivers in the SFA, receives hatchery stocking.

Returns of wild salmon and grilse to Morgan Falls have declined from a high of 3,015 in 1987, to low of 371 in 1997. Returns have decreased even though distant and local interceptory fisheries have been closed.



Egg deposition above Morgan Fall was 54% of the conservation requirement. Returns of wild salmon to Morgan Falls contributed 54% of the deposition of 1.05 million eggs. Returns from hatchery stocking contributed 46% of the egg deposition. Removals in the recreational fishery below Morgan Falls were average.

The decline in returns to Morgan Falls is not the result of previous low spawning escapements. Instead, low returns in recent years reflect lower marine survival. This is apparent in the return rate of hatchery smolts released into the LaHave River. Return rates to Morgan Falls for hatchery smolts released, 1992 - 1995, averaged 1.48% for 1-sea-winter (1SW) and 0.26% for 2-sea-winter (2SW) salmon. These rates are down from average return rates of 2.81% and 0.7%, respectively, for 1984 to 1988. Return rate of wild smolts from above Morgan Falls was 2.18% to grilse in 1997.



Outlook

Short term

Wild salmon are not expected to meet conservation requirements in any of the rivers in SFA 21 in 1998. If marine survival improves in 1998, conservation may be met by wild and hatchery returns in some rivers.

Long term

Until marine survival improves substantially, wild grilse and large salmon are not expected to return in adequate numbers to meet conservation requirements.

There has been no noted improvement in water quality (reduced acidity) in SFA 21 rivers. Therefore, no increase in wild salmon returns is expected.

Management Considerations

Forecasts of returns in 1998 suggest that there is a 60% chance that the conservation requirement above Morgan Falls of 1,320 fish will be met. At a 29% exploitation rate, equal to that of 1997, the chance of meeting the conservation requirement is about 30%.

Even with hatchery stocking, conservation is not expected to be met in 1998. To increase the chance of meeting conservation

requirements, exploitation should be minimized. If exploitation occurs, removals should be restricted to hatchery grilse.

Morgan Falls trap counts will again be used as an index of within-year run-strength for SFA 21. Adjustments to exploitation could occur after a June 15 assessment of the end-of-season count at Morgan Falls.

Production or colonization by salmon is presently impossible in some of the more acidified rivers of SFA 21. Native salmon stocks have been extirpated in these rivers as a result of acidification and/or obstructed fish passage. Stocking of hatchery grown smolts provide harvest fisheries to the Mersey, Jordan and Clyde rivers. Returns to these rivers in 1998 will be exclusively hatchery origin fish. Therefore, the level of exploitation on these fish is not currently a conservation concern.

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