International Council for
The Exploration of the Sea

North Atlantic Salmon
Working Group
Working Paper 01/09

Causes of the escape of farmed Atlantic salmon from sea cages in British Columbia and North America

by

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29 March 2001

Introduction

The Working group has been requested to assess the possible reasons for the presence of farmed salmon in fisheries and stocks in different areas. For these fish to find their way into fisheries or rivers, they first have to escape. This paper reviews available data on escape events and their causes in British Columbia and the Bay of Fundy salmon farming regions.

British Columbia

In the last five years, total number of reported escaped farmed fish escaped from sea cage sites in British Columbia have stabilized at about 1% of the annual total salmon production (49,100 mt in 1999; all species of salmon). BC Fisheries (2000) reviewed the causes of escapes for the period 1996 –2000. Causes were grouped under the headings of 1) Net failure, 2) System failure, 3) Handling, and 4) Boat.

"Net failures" were losses caused by predators, maintenance problems, and other known and unknown incidences that could result in a net being cut.

"System failures" were due to problems with the hardware of either the sea cages (mooring, cage supports) or the transport barges.

"Handling" encompassed accidents during the transfers/sampling of fish during the culture process, or during the towing of cages from site to site.

"Boat" was ramming a cage with a tender.

In the 1996 –2000 period, 26 escape incidents were recorded. The break down by year for the number of incidents and their causes was:

Year	Net failure	System Failure	Handling	Boat
1996	1	0	2	0
1997	4	0	0	1
1998	3	1	2	1
1999	1	0	5	1
2000	2	0	1	1

On average there were 5.2 reported escape events per year. Of these 26 events, 42% resulted from net failures (including six due to predator attacks), 4% from system failures (none from mooring problems), 39% from Handling, and 15 % from Boat events.

Bay of Fundy

The North American East Coast Atlantic salmon sea cage industry is concentrated in the Bay of Fundy region. This is primarily the Passamaquoddy Bay area on the Canadian side of the Border, and Cobscook Bay on the US side.

Historically, there has been little public reporting of escape events or of the number of fish liberated in this area. Escapes did occur, and since 1992 annual counts have been made of the number of wild and escaped-farmed salmon entering the Magaguadavic river fish ladder, in Passamaquoddy Bay. Farmed salmon numbers peaked in 1994 at 1200. Since then, they have steadily declined to a total of 30 in 2000, the smallest value in the time series.

Below is a log of the escapes occurring during since December 1999. The information was obtained from newspaper reports or press releases of escape events in this region.

1) December 1999, Annapolis Basin, Canada: cages fail in a storm releasing 50,000 Atlantic salmon.
2) October 2000, Tinkers Island, Canada: anchor system collapses in normal operating conditions for no immediately apparent cause, releasing 3,000-30,000 salmon.
3) October 2000, Bras d'Or lakes, Canada: Vandalism releases 25,000 rainbow trout.
4) November 2000, Cobscook Bay, USA: Boat collision releases 13,000 fish.
5) November 2000, Nantucket Island, Canada: Storm collapses anchor system releasing 15,000 fish.
6) December 2000, Machias, USA: Storm collapses cages releasing > 100,000 salmon.

Thus three of six releases were storm related, one involved a boat collision, one was vandalism, and for one the causes remain unknown.

Conclusion

The data suggest that the present escapement from the fish farms in these two areas appear to result from inevitable human errors, and severe events like storms that exceed the engineering capacity of the equipment used. It may be possible to reduce future escapement as new technologies are developed, and as process like HAACP (Hazard Assessment Critical Control Points) are applied to the industry.

Escapes will continue to occur, and while severe storms will be most likely in autumn and winter, it will be difficult to predict when human error will occur. Consequently, the entry of farmed fish to the wild will retain a large degree of unpredictability.

References

B. C. Fisheries 2000. Escapes of farmed salmon in British Columbia-1996-2000. August 2000.