



ENVIRONMENTAL DAMAGE FROM ESCAPED FARMED SALMON

The escape of millions of salmon from enormous net pens every year has drastically altered marine environments, coastal rivers, and associated food chains around the world. These fugitive fish pose a new and little understood form of environmental pollution.

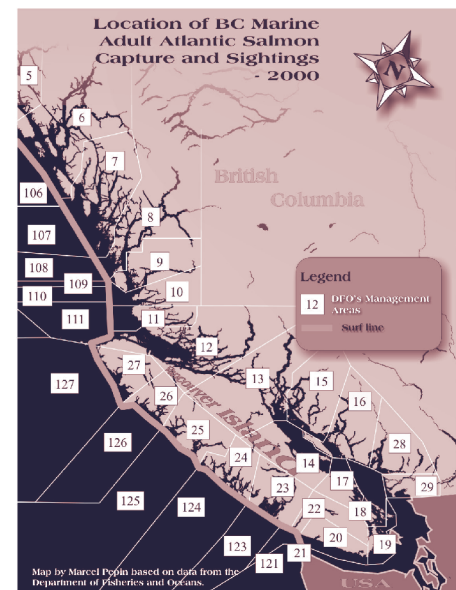
- Mass escapes of farmed salmon can result in interbreeding and competition with wild salmon for food, habitat, and mates.
- Escaped fish transmit diseases and parasites to wild salmon, and threaten to establish viable colonies that could not only push wild salmon to extinction, but also related species such as steelhead salmon and sea trout.

PENNED BUT UNCONFINED

Open at the top, salmon net pens allow thousands of fish at a time to escape easily when there are rough seas and high waves. Other small scale escapes (called “leakage” by the industry) routinely occur from poorly maintained pens. Together, these produce staggering annual losses. Globally, an estimated three million salmon escape from farms annually^{1,2}

- In a single incident in 2005, nearly half a million salmon escaped from a Norwegian salmon farm.³
- One million farmed salmon in Chile escaped on one occasion in 2004.⁴
- 600,000 salmon in the Faeroe Islands cleared pens during a storm in 2002.⁵

These and hundreds of other escapes have had a serious cumulative effect: more than 1.7 million farmed salmon escaped to the wild from farms in Scotland since 1998;⁶ between 9 million and 18.6 million escapes from Chilean farms since factory operations started there in the 1980s;⁷ more than one million Atlantic salmon escaped from farms in Washington State since commercial operation began there.⁸



Map by: Marcel Pepin, David Suzuki Foundation

ENVIRONMENTAL AND GENETIC CHAOS

Although large scale salmon farming has been practiced for less than 20 years, vast numbers of domesticated escapees are rapidly invading and colonizing the world's oceans and spawning rivers.

- Scientists calculate that as much as 90 percent of the salmon in some rivers of the Faeroe Islands, Norway, Scotland, Ireland, and Canada are fugitives and their progeny.
- In 1983, escapees accounted for only 5.5 percent of the salmon in New Brunswick's Magaguadavic River; ⁹ by 1995 the percentage had jumped to 90 percent. The invasive domesticated salmon also introduced sea lice, never before reported in the area.
- In 1995, escaped Atlantic salmon had moved into 18 British Columbia rivers; six years later, they were living in 77 rivers and streams throughout the province.¹⁰
- In 1999, samples of four domestic Atlantic salmon escapees and 10 wild salmon returning to the Magaguadavic River to spawn showed all fish carried the Infectious Salmon Anaemia (ISA) virus—never before seen in wild salmon.¹¹
- The Scottish government reported in 2002 that three out of four salmon escapes occurred from farms affected by highly contagious and often fatal Infectious Pancreatic Necrosis.¹²

FARMED SALMON DISPLACING WILD STOCKS

Virtually all factory farmed salmon are descended from 40 original stocks of Norwegian Atlantic salmon.¹³ Successive breeding has selected for large, fast maturing, adaptable, somewhat aggressive salmon. These genetically similar fish often out-compete with native wild salmon for food, habitat, and mates. In contrast, wild salmon have developed into many genetically distinct types, specially adapted to particular geographic regions within the marine environment. Successive infusions of newly escaped farmed salmon, however, have enabled a genetically inferior but physically dominant fish to interbreed and compromise the long-term survival not only of wild salmon, but also of other genetically related fish including brown trout.¹⁴

A 10-year Irish study showed conclusively that repeated escapes from salmon farms could lead to extinctions in wild Atlantic salmon populations.¹⁵ Elsewhere, populations of escaped Atlantic salmon being farmed in the Pacific Northwest jeopardize native wild Pacific salmon, vying with wild species for food and habitat.

Initially, the chances of survival in the wild for farmed Atlantic salmon were assumed to be slim, but the sheer number of escapees has increased the chances of success significantly. A Scottish scientific study recently reported on one measure of their viability in the wild: more than half a million salmon have escaped into just one Scottish loch system since a salmon farm was established in 1986 near the mouth of the River Ewe. Between 1987 and 2001, farmed salmon clearly established themselves in the river, indicated by the fact that they were caught by rod fishermen in 13 of the 15 years during the study period. In one year, escapees constituted at least 27 percent of potential spawning salmon in the Ewe.¹⁶

INERTIA BY INDUSTRY AND GOVERNMENTS

The global aquaculture industry has largely ignored criticism and concerns over mass escapes. The North Atlantic Salmon Conservation Organisation, comprised of member salmon farming nations, established a liaison group between salmon farmers, the government, and wild fish interests.¹⁷ It also issued well-intentioned, but largely ineffective "Codes of Practice." Escapes and "leakage" continue

unabated, while meaningful methods of control are postponed or rejected as uneconomical. For example, companies have resisted tagging programs that would make it possible to track escaped fish—and easier for authorities to hold farm operators responsible.

Countries with salmon aquaculture have also failed to tackle the growing problem of escapes. They, too, have resisted tagging programs, instead imposing symbolic fines on companies that fail to report salmon escapes.

Scotland, for example, has a law on reporting escapes, but mass losses continue as before. Canada publishes annual escape figures but does not compile or issue the names of responsible companies.

Other strategies for slowing the biological and environmental “pollution” from domesticated salmon are available, although none is presently under serious consideration. Among these are (1) domesticating cultured salmon to render them incapable of breeding in the wild, and (2) sterilizing farmed-raised fish.

Absent a biologically safer domesticated salmon, mass escapes can only be stopped with a fundamental reconsideration of the net pen system. Closed containment, for example, would reduce escapes in one stroke. Not surprisingly, neither the salmon aquaculture industry nor national governments are yet willing to face up to this problem or work toward a solution. Their inaction only makes the problem worse.

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4 SFPG, *Op cit.*

5 “600,000 farmed salmon lost in Faeroe Islands,” *Seafood News*, February 28, 2002, <<http://list.zetnet.co.uk/pipermail/seatrout-rev/2002March/000109.html>>.

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8 Official Washington State government figures: [citation?]

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12 Salmon Farm Protest Group, “Mass fish farm mortalities and escapes threaten the survival of wild salmon,” Salmon Farm Protest Group press release, August 1, 2003, <www.salmonfarmmonitor.org/pr010803.shtml>.

13 Naylor, *op. cit.*, p. 430.

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15 P. McGinnity et al., “Fitness reduction and potential extinction of wild populations of Atlantic salmon, *Salmo salar*, as a result of interactions with escaped farm salmon,” *Proceedings in Biological Science*, 270:1532 (2003), pp. 2443-50, <www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14667333&itool=iconft>.

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17 North Atlantic Salmon Conservation Organization, Web site, <www.nasco.org>.