

An aerial photograph of a salmon farm in a fjord. The water is calm and greyish. Numerous circular pens are arranged in a grid-like pattern, connected by lines. A small boat is visible near the pens. In the background, a steep, forested hillside rises from the water's edge.

Escapes and “Human Failure”

The Atlantic Canadian Perspective

Michael Szemerda

VP Saltwater Production

Kelly Cove Salmon

General Causes of Escape

- Structural Failure of farm infrastructure.
- Operational / Management Failure during routine operations.
- Biological Failure that includes predator attacks and vandalism

Acute losses - most often a combination of weather and equipment / structural failure

Ice may cause significant damage to the operation leading to an escape opportunity.



HDPE Collar Elongation & Collapse

Single storm damage

Elongation of the HDPE collar to failure



HDPE Pipe Damage



Permanent kinking of the HDPE pipe

HDPE surface pipe broken



Operational “Human” Failure

- Saltwater Operations

Critical operational points for the potential of Atlantic salmon escape.

Broad Operational Categories	Specific Potential Escape Vectors	Possible Frequency of Occurrence	Chronic or Acute Escape	Possible Number of Net Pen Escapes per Event
Fish Handling	Hatchery Smolt Transfers	Once	Chronic → Acute	Up to Entire Truck Load (0-40,000)
	Weight Sampling & Sea Lice Counts	Monthly / Weekly	Chronic	Up to Entire Sample (0-30)
	Grading & Splitting Populations	Once	Chronic → Acute	Up to Entire Stock (0-120,000)
	Fish Health Treatments	Monthly	Chronic → Acute	Up to Entire Well Boat Load (0-40,000)
	Harvesting Stock	Once	Chronic → Acute	Up to Entire Harvest Number (0-50,000)

Operational “Human” Failure

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Critical operational points for the potential of Atlantic salmon escape.

Broad Operational Categories	Specific Potential Escape Vectors	Possible Frequency of Occurrence	Chronic or Acute Escape	Possible Number of Net Pen Escapes per Event
Farm Procedures	Net Changes	0-3 Times	Chronic → Acute	Up to 50% of Stock (0-60,000)
	Securing Vessels to Net Pens	Daily	Acute	Up to Entire Stock (0-120,000)
	Towing of Net Pens with Stock	0-2 Times	Chronic → Acute	Up to Entire Stock (0-120,000)
	Diver Entry for Mort Removal or Stock Inspections	Weekly to 3x/wk	Chronic	Low Likelihood for Large Escape (0-1,000)

Reducing the Human Factor

- The causes for farmed fish escape are complex and varied
- “human error” not always on the part of site crew
 - QA/QC at net loft when seam let go on new net
 - Fishermen on “auto-pilot”







Reducing the Human Factor

Can it really be eliminated?! No

- Training in procedures / equipment use
- Written SOPs
- 3rd party certifications
- Codes of Containment
- Daily operations planned to minimize the possibility for escape – tide, weather
- Work with service providers – net loft, divers

Daily attention to detail – hard to maintain / ensure

Questions



Thank you

