Mean Annual Discharge and Atlantic Salmon

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Function Updated by leah.egeryhaley on Tue, 06/23/2026 - 18:15.

Species Information

Common Name: Atlantic Salmon
Genus: Salmo salar

Stressor Details

Stressor Name: Flow
Units: %
Metric: Mean Annual Discharge (MAD)
Scale: linear
Function Type: continuous
Vital Rate/Process: Survival

Life Stage & Context

Life Stages: Egg
Geography: Catamaran Brook, NB, Canada
Season: Winter

Descriptions

Overview

Final curve was derived from a linear regression.

System capacity was derived from the 11 years for which egg survival data were available. How egg survival data was gathered was not found in the original source.
To normalize and rescale each ecological response, each value was scaled by the maximum ecological response observed in the study such that mean habitat capacity percentage (normalized response) = response / maximum ecological response observed.
Implicit pathway of effect: Atlantic salmon egg survival is positively associated with higher average winter discharge.

Function Derivation

Observational data. Final curve was derived from linear regression.

Transferability of Function

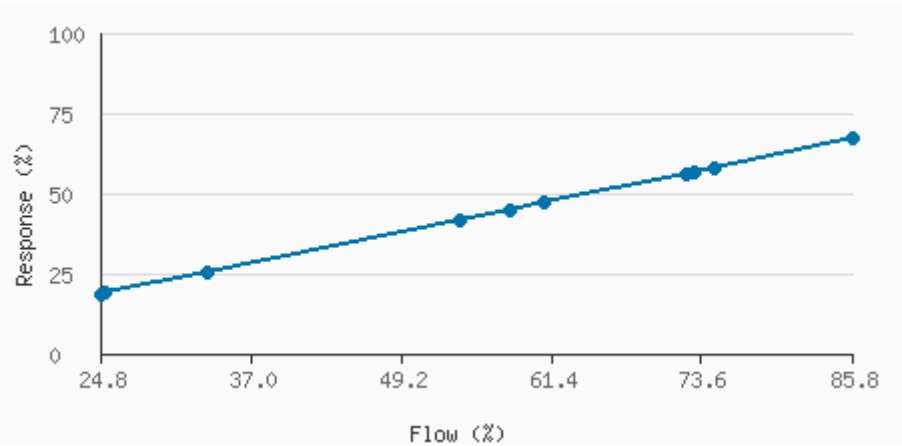
Appropriate for winter stream flow impacts on Atlantic Salmon egg survival. General transferability to other salmon stocks in unclear, but likely appropriate for other autumn-spawning salmonids (i.e., regions with similar hydrology to the Catamaran Brook).
The relationship may be unreliable if extrapolated to a flow range outside the original data (see the Average Salmonid flow-ecology SR function entry based on Rosenfeld and Enright (2025) for a more generalizable function across a wider range of flows).

Source of Stressor Data

The winter streamflow data (discharge) for Catamaran Brook was collected using a streamflow gauging station located in the mid-basin. See methods of Cunjack et al. 2013 for details.
Data was then standardized by dividing absolute flow by MAD to achieve %MAD values (see Rosenfeld & Enright 2024).

> Such standardization allows for comparison of flow metrics across a wide range of stream sizes (see Rosenfeld et al. 2017).

Stressor Response Data



?PERCENT_MAD	Mean System Capacity (%)	SD	low.limit	up.limit
24.76323077	18.6829523	0	0	100
25.21738462	19.0417338	0	0	100
33.51446154	25.5964246	0	0	100
54.044	41.81476	0	0	100
58.02938462	44.9632138	0	0	100
60.75584615	47.1171185	0	0	100
72.29323077	56.2316523	0	0	100
73.05092308	56.8302292	0	0	100
74.59430769	58.0495031	0	0	100
85.76938462	66.8778138	0	0	100

Citations

Cunjak, R.A., Linnansaari, T., and Caissie, D. 2013. The complex interaction of ecology and hydrology in a small catchment: a salmon's perspective. Hydrol. Process. 27: 741-749.