Naman 2026: HSI Coho Juvenile Velocity (12°C daily net energy intake)

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Species Information

Common Name: Coho Salmon
Genus: Oncorhynchus kisutch

Stressor Details

Stressor Name: Velocity
Units: m/s
Metric: Water Velocity (focal velocity) at 12°C
Scale: linear
Function Type: continuous
Vital Rate/Process: Habitat Suitability Index

Life Stage & Context

Life Stages: Fry, Parr
Geography: British Columbia (composite BC invertebrate database)
Activity: rearing
Season: Summer rearing

Descriptions

Overview

> Temperature-dependent velocity suitability for a 6.5-cm, 3-g juvenile Coho Salmon, derived from the daily net energy intake (NREId, J/d; black line) predicted by a drift-foraging bioenergetic model at 12°C. NREId = daily gross energy intake (capped by temperature-dependent maximum consumption, Cmax) minus daily foraging and standard metabolic costs. Values here are scaled 0–100 relative to the maximum of this 12°C line only (peak ?1707 J/d at ~0.13 m/s), not the global maximum across temperatures used for the paper's Figure 3 HSCs. At 12°C Cmax is not limiting, so intake and the optimal velocity are higher than at 6°C. Points were taken at the plotted model vertices (0.01–0.33 m/s, every 0.02 m/s) from the figure's vector line work; a final 0 was added at 0.334 m/s by extrapolating the last segment to NREI = 0, since the paper assigns 0 suitability to negative energy intake.
>
> Stressor-response relationship data sourced from: Figure 2 — daily net energy intake (black line) vs. velocity, 12°C panel (right) (p. 4).
>
> See linked SR Curve for 6C:
> https://mjbayly.com/stressor-response/naman-2026-hsi-coho-juvenile-velocity-6degc-daily-net-energy-intake

Function Derivation

> Mechanistic drift-foraging (NREI) bioenergetic model expressed on a daily time step with temperature-dependent costs and Cmax (BioenergeticHSC + Wisconsin bioenergetics).

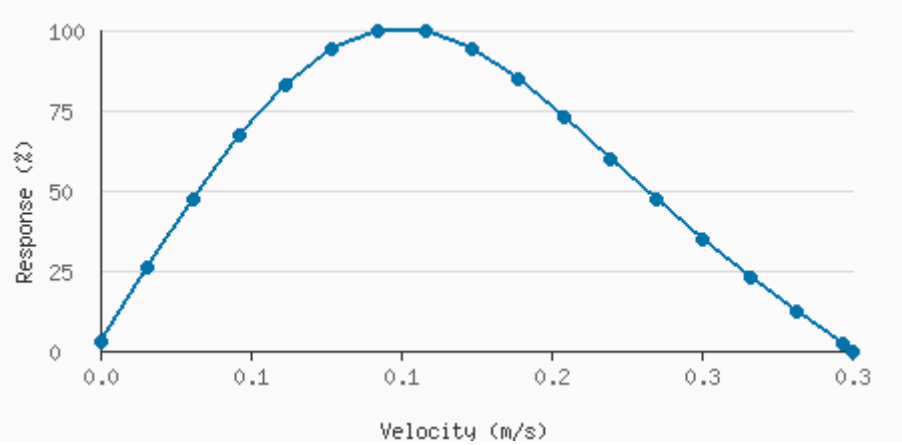
Transferability of Function

> Specific to a 6.5-cm Coho at the stated temperature and BC composite drift; conceptual worked example rather than a site-calibrated curve.

Source of Stressor Data

> Model output (BioenergeticHSC) using composite BC invertebrate drift data, 14 h foraging time, 50% reduction in prey detection/capture.

Stressor Response Data



Raw Stressor Values	Scaled Response Values 0 to 100	SD	low.limit	up.limit
0.01	3	0	0	100
0.03	26	0	0	100
0.05	47	0	0	100
0.07	67	0	0	100
0.09	83	0	0	100
0.11	94	0	0	100
0.13	100	0	0	100
0.15	100	0	0	100
0.17	94	0	0	100
0.19	85	0	0	100
0.21	73	0	0	100
0.23	60	0	0	100
0.25	47	0	0	100
0.27	35	0	0	100
0.29	23	0	0	100
0.31	12	0	0	100
0.33	2	0	0	100
0.334	0	0	0	100

Citations

Naman, S. M. (2026). Developing temperature-dependent habitat suitability curves for instream flow modeling. North American Journal of Fisheries Management. Advance online publication. https://doi.org/10.1093/najfmt/vqag077