Hampton 1988: HSI Coho Fry Velocity

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Species Information

Common Name: Coho Salmon
Genus: Oncorhynchus kisutch

Stressor Details

Stressor Name: Velocity
Units: m/s
Metric: Water Velocity (mean column velocity)
Scale: linear
Function Type: continuous
Vital Rate/Process: Habitat Suitability Index

Life Stage & Context

Life Stages: Fry
Geography: Trinity River California
Activity: rearing
Season: Summer (rearing)

Descriptions

Overview

Trinity River coho salmon velocity habitat suitability curve (Hampton 1988) as used by Rosenfeld & Ptolemy (2012) in PHABSIM modelling of Husdon Creek, BC. It is the most extreme of the three curves compared, with optimal suitability at 0 m/s, a near-vertical drop to ~0.13 by 0.03 m/s and a long tail approaching 0. The depth optimum of the companion curve (~0.34–0.39 m, i.e. 1.1–1.3 ft) matches Hampton's coho fry criteria. Values were extracted from the vector line work of the published figure (dotted/solid lines traced point-by-point and simplified), so they approximate the original curves to within ~0.01 m and ~1 suitability unit. Note the figure's axis labels read cm·s?¹ and cm, but the scales (0–1.5) are clearly m/s and m.

Stressor-response relationship data sourced from: Rosenfeld & Ptolemy (2012) Fig. 2a - Velocity habitat suitability curve for coho salmon, Trinity River (dotted line) (p. 1923).

Likely to have low transferability.

Function Derivation

Empirical frequency-of-use (use/availability) preference curve from snorkel observations, smoothed and normalized to 0-1.

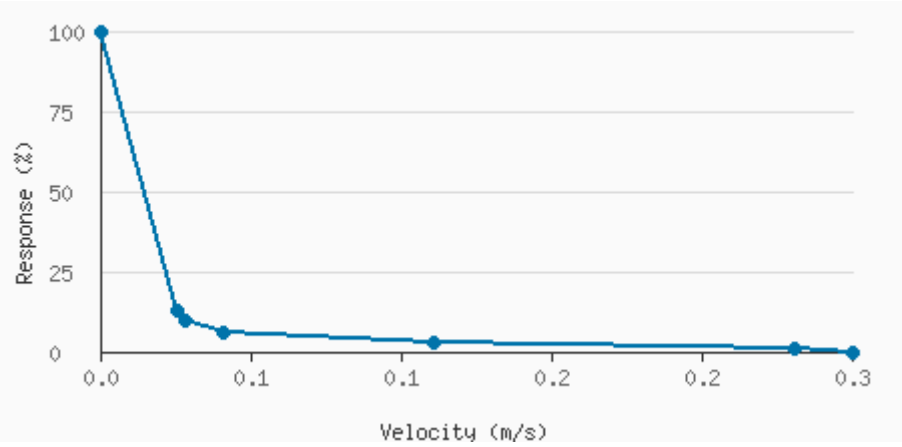
Transferability of Function

LOW: Developed for a large regulated California river; the extreme preference for zero velocity is likely site-specific.

Source of Stressor Data

Hampton (1988): snorkel observations of coho fry (?50 mm FL; 130 observations, 913 fish) vs. IFG4-modelled habitat availability, 1985–1987.

Stressor Response Data



Raw Stressor Values	Scaled Response Values 0 to 100	SD	low.limit	up.limit
0	100	0	0	100
0.031	13	0	0	100
0.034	10	0	0	100
0.049	6	0	0	100
0.133	3	0	0	100
0.277	1	0	0	100
0.3	0	0	0	100

Citations

Rosenfeld, J. S., & Ptolemy, R. (2012). Modelling available habitat versus available energy flux: Do PHABSIM applications that neglect prey abundance underestimate optimal flows for juvenile salmonids? Canadian Journal of Fisheries and Aquatic Sciences, 69(12), 1920–1934. https://doi.org/10.1139/f2012-115.

Hampton, H. (1988). Development of habitat preference criteria for anadromous salmonids of the Trinity River. U.S. Department of the Interior, Fish and Wildlife Service, Division of Ecological Services, Sacramento, California.

References

Rosenfeld and Ptolemy 2012 - https://doi.org/10.1139/f2012-115