Ptolemy (n.d.): HSI Coho Juvenile 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, Parr
Geography: British Columbia (composite)
Activity: rearing
Season: Summer (rearing)

Descriptions

Overview

> British Columbia juvenile coho velocity habitat suitability curve (R. Ptolemy, unpublished) used by Rosenfeld & Ptolemy (2012) in PHABSIM modelling. Compared with the Trinity and Beecher curves, it extends full suitability to intermediate velocities: suitability is 1.0 from 0 to ~0.12 m/s, declines to ~0.77 at 0.19 m/s and ~0.24 at 0.33 m/s, and reaches 0 at ~0.45 m/s. Values were extracted from the vector line work of the published figure (solid polyline vertices), 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. 2e - Velocity habitat suitability curve for coho salmon, Ptolemy (solid line) (p. 1923).
>
> This curve seems to be used very frequently across instream flow studies, despite being unpublished. Users are encouraged to source their own data. There is no data associated with this relationship (context, fish age/stage/size, etc.).

Function Derivation

> Empirical: fish density assessments coupled with stream transects (R. Ptolemy, unpublished data).

Transferability of Function

> Developed from BC streams across a range of sizes; underlying data unpublished.

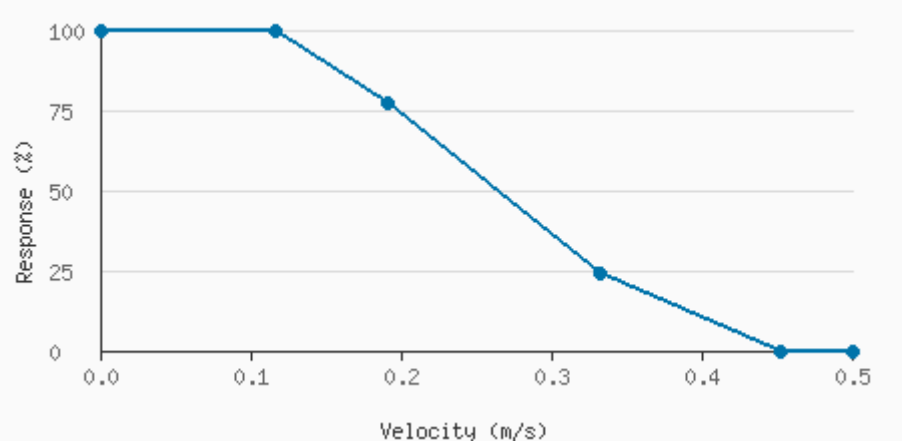
Source of Stressor Data

> R. Ptolemy (BC Ministry of Environment), unpublished juvenile coho density and transect data from streams throughout British Columbia.

Stressor Magnitude Data

unknown

Stressor Response Data



Raw Stressor Values	Scaled Response Values 0 to 100	SD	low.limit	up.limit
0	100	0	0	100
0.117	100	0	0	100
0.191	77	0	0	100
0.333	24	0	0	100
0.453	0	0	0	100
0.5	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.

References

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