Temperature and Salish Sucker System Capacity

Function Updated by mbayly on Thu, 04/24/2025 - 19:11.

Species Information

Common Name: Salish Sucker
Genus: Catostomus sp.

Stressor Details

Stressor Name: Water Temperature
Units: °C
Scale: linear
Function Type: continuous
Vital Rate/Process: CPUE

Life Stage & Context

Life Stages: Adults
Geography: Lower Fraser Valley (British Columbia)
Activity: All activities
Season: All seasons

Descriptions

Overview

> Three data sources of information were considered for deriving the final curve i.e., Pearson (2004), Rosenfeld et al. (2021) and Edwards (1983). In addition, we considered the expert opinion provided at the workshop conducted in November 2024. Maximum system capacity was defined by standardizing data to the highest value for CPUE (fish trap-1). It should be noted that Salish sucker are thought to be somewhat more warm-adapted than Longnose sucker, which are much more widely distributed and considered to be a cool-water species; temperature data for Salish sucker appears to support this inference, since the temperature curve foe Salish sucker appears right-shifted to higher temperatures relative to Longnose sucker. The final curve was derived by fitting a Generalized Additive Model (GAM) to original CPUE data from Rosenfeld et al. (2021). The fitted GAM curve was marginally significant (p

Function Derivation

> Based on data from Salish Sucker, supported by data from Longnose Sucker; Empirical data (correlative model); Published; Expert opinion

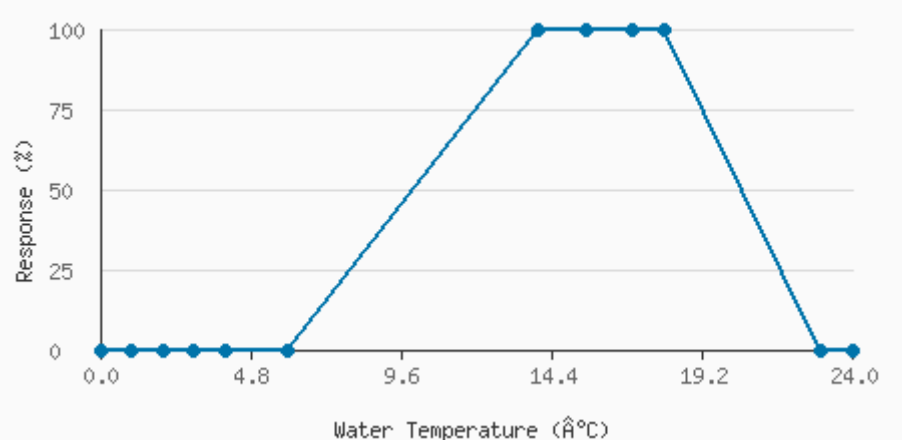
Transferability of Function

> As local adaptations are likely minimal among different Salish Sucker populations, we would not expect much variation in true tolerance among populations. This function should therefore be broadly applicable to all populations of the species, with the caveat that it is partly based on data from longnose sucker.

Source of Stressor Data

> This is largely to be determined, but it will likely be a combination of data from Rosenfeld et al. (2021), data collected by Samantha Ramirez (2024) as part of her M.Sc. thesis, and a database of current and future projections produced by Dr. Iacarella with DFO and collaborators (currently unpublished, but see (Weller et al. (2023).

Stressor Response Data



Temperature (?C)	Mean System Capacity (%)	SD	low.limit	up.limit
0.00	0.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	0.00
2.00	0.00	0.00	0.00	0.00
3.00	0.00	0.00	0.00	0.00
4.00	0.00	0.00	0.00	0.00
6.00	0.00	0.00	0.00	0.00
14.00	100.00	0.00	50.82	123.77
15.50	100.00	0.00	63.11	132.79
17.00	100.00	0.00	63.11	134.43
18.00	100.00	0.00	58.20	134.43
23.00	0.00	0.00	0.00	0.00
24.00	0.00	0.00	0.00	0.00

Citations

Usoof, A.M. and Rosenfeld, J.S. 2024. Relationship between system capacity and mean water temperature for Salish Sucker.

Edwards, E. A. 1983. Habitat Suitability Index Models: Longnose Sucker. U.S. Dept. Int., FishWildl. Serv. FWS/OBS-82/10.35.

Pearson, M. P. 2004. The ecology, status and recovery prospects of Noonsack Dace (Rhinichthys Cataractae ssp.) and Salish Sucker (Catostomus sp.) in Canada. PhD Thesis. University of British Columbia.

Ramirez, S. Z. 2024. Modelling the impact of human development and water quality on hypoxia. MSc Thesis. University of British Columbia.

Rosenfeld, J., M. P. Pearson, J. Miners, and K. Zinn. 2021. Effects of landscape-scale hypoxia on Salish sucker and salmonid habitat associations?: implications for endangered 1233:1219–1233.

Weller, J. D., R. D. D. Moore, J. C. Iacarella, J. D. Weller, R. D. D. Moore, J. C. I. Nov, and J. D. Weller. 2023. Thermalscape scenarios for British Columbia , Canada. Canadian Water Resources Journal / Revue canadienne des ressources hydriques.