

Bowerman et al. 2018: Temperature and Chinook Prespawn

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Species Information

Common Name: Spring Chinook Salmon

Latin Name: tshawytscha

Genus: Oncorhynchus

Stressor Details

Stressor Name: Temperature

Units: C

Metric: 7-DADM

Scale: linear

Function Type: continuous

Vital Rate/Process: Survivorship

Life Stage & Context

Life Stages: Spawners

Geography: Willamette River, OR

Activity: Prespawn

Season: Summer

Descriptions

Overview

Density-independent survivorship for spring Chinook upstream migration and holding and stream temperature. Stream temperature is modelled as the 7-day average of daily maximum (7-DADM). Functional relationship is originally sourced from the Willamette River OR (see original source data from (Bowerman et al. 2018).

Regression line shows relationship for wild (non-hatchery) origin fish. Mortality increases with stream temperature

General Application Prespawn

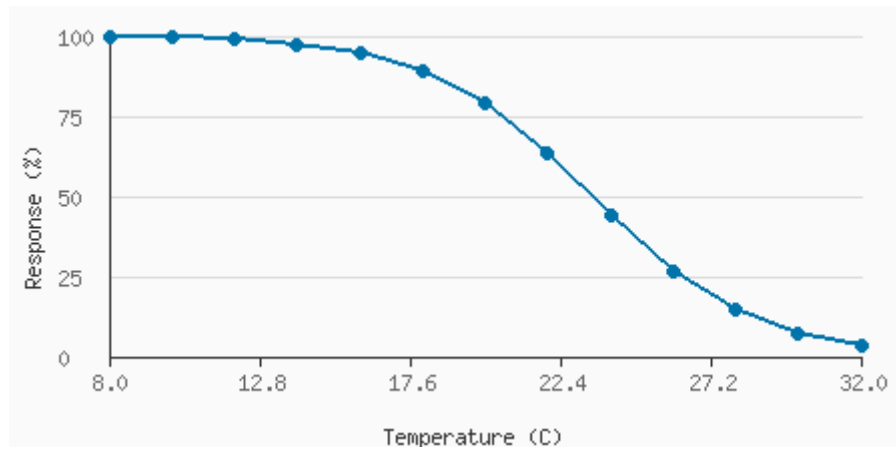
Stressor Magnitude Data

Empirical model that estimates fine sediment from road density, slope and bankfull width

Pathways of Effect

Upland development, road building, fine sediment, smothering of eggs, egg to fry survivorship

Stressor Response Data



Stressor (X)	Mean System Capacity (%)	SD	low.limit	up.limit
8	99.74	0	99.74	99.74
10	99.44	0	99.44	99.44
12	98.8	0	98.8	98.8
14	97.43	0	97.43	97.43
16	94.59	0	94.59	94.59
18	88.96	0	88.96	88.96
20	78.8	0	78.8	78.8
22	63.16	0	63.16	63.16
24	44.15	0	44.15	44.15
26	26.72	0	26.72	26.72
28	14.39	0	14.39	14.39
30	7.2	0	7.2	7.2
32	3.45	0	3.45	3.45

Citations

Beechie, T. J., C. Nicol, C. Fogel, J. Jorgensen, J. Thompson, G. Seixas, J. Chamberlin, J. Hall, B. Timpane-Padgham, P. Kiffney, S. Kubo, and J. Keaton. 2021. Modeling Effects of Habitat Change and Restoration Alternatives on Salmon in the Chehalis River Basin Using a Salmonid Life-Cycle Model. U.S. Department of Commerce, NOAA Contract Report NMFS-NWFSC-CR-2021-01.

Bowerman, T., A. Roumasset, M. L. Keefer, C. S. Sharpe, and C. C. Caudill. 2018. Prespaw mortality of female Chinook salmon increases with water temperature and percent hatchery origin. Transactions of the American Fisheries Society 147:31-42.

References

Beechie et al 2021 - <https://repository.library.noaa.gov/view/noaa/29486>