Bowerman et al., 2021: Chinook Temperature and Prespawn

Species Information

Common Name: Chinook Salmon
Latin Name: tshawytscha
Genus: Oncorhynchus

Stressor Details

Stressor Name: Stream Temperature
Units: °C
Metric: Mean August Stream Temperature
Scale: linear
Function Type: continuous
Vital Rate/Process: Pre-spawn Survivorship

Life Stage & Context

Life Stages: Spawners
Geography: Interior Columbia River Basin
Activity: Spawning
Season: Summer

Descriptions

Overview

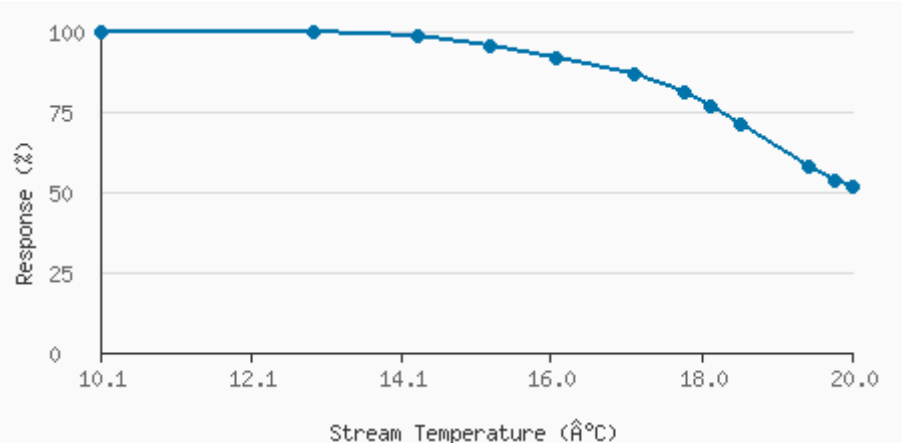
Predicted pre-spawn mortality. Composite curve across populations in the Interior Columbia River Basin. Model parameters included Day (of year), Fish Length, Origin (hatchery or wild) and Mean August Stream Temperature. Figure shows partial plot for stream temperature after accounting for other covariates.

Mortality rates from monitoring data (5 - 14 years across 49 stream reaches). Survey methods differed between programs, but authors used data filtering criteria.

This stressor response curve shows data for Natural Origin Chinook (excluded hatchery origin) and a mean value between the 5th and 95th percentile of fish length (generalized curve).

General Application Prespawn

Stressor Response Data



Stressor (X)	Mean System Capacity (%)	SD	low.limit	up.limit

10.1	100	0	100	100
12.91	100	0	100	100
14.27	98.45	2	85	98
15.22	95.34	3	85	95
16.09	91.71	6	75	95
17.11	86.53	10	60	95
17.79	80.83	15	33	93
18.11	76.68	20	33	93
18.52	70.98	20	33	93
19.42	58.03	20	20	85
19.76	53.37	20	20	80
19.98	51.81	20	15	80

Citations

Bowerman, T. E., Keefer, M. L., & Caudill, C. C. (2021). Elevated stream temperature, origin, and individual size influence Chinook salmon prespawn mortality across the Columbia River Basin. Fisheries Research, 237, 105874.

References

Bowerman et al 2021 - https://www.sciencedirect.com/science/article/abs/pii/S0165783621000023