

Bowerman et al., 2021: Chinook Temperature and Prespawn

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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

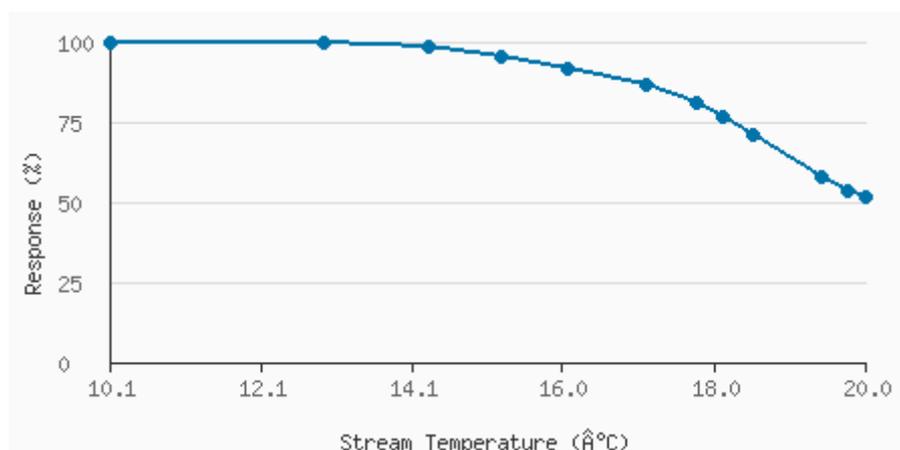
Predicted pre-spawn mortality. Composite curve across populations in the Interior Columbia River Basin. Model parameters included Day (of year), Fish Length, Origin (hatchery or wild) and Mean August Stream Temperature. Figure shows partial plot for stream temperature after accounting for other covariates.

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>