Honea et al. 2009: Temperature and Chinook Survivorship

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Species Information

Common Name: Chinook Salmon
Genus: Oncorhynchus tshawytscha

Stressor Details

Stressor Name: Temperature
Units: C
Metric: Mean of Daily Maximum Temperatures (Aug-Sept)
Scale: linear
Function Type: continuous
Vital Rate/Process: Survivorship

Life Stage & Context

Life Stages: Spawners
Activity: Spawning
Season: Spring, Spawning Season

Descriptions

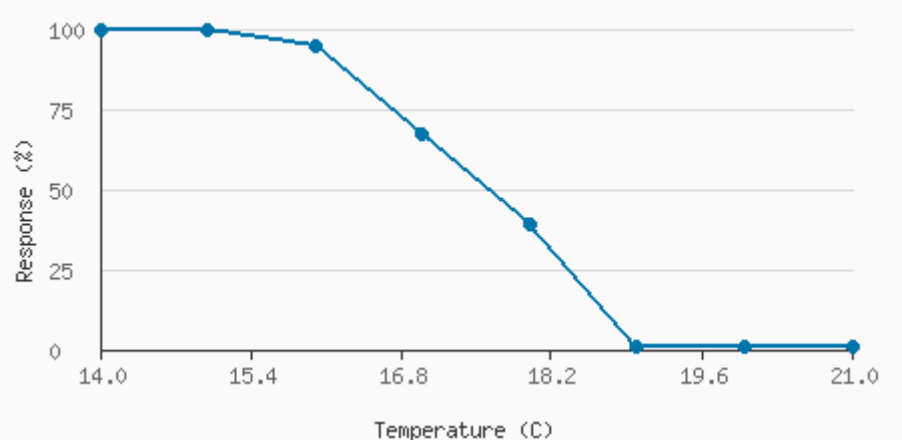
Overview

> Function applied in Honea et al., (2009) for hatchery spring-run Chinook salmon survival. Spawner stage: Survivorship of spring-run Chinook spawners and water temperature (from reviews by McCullough, 1999; and Richter & Kolmes, 2005). The function is based on Cramer's (2001) observations of reduced survivorship of hatchery fish.
>
> Surv = 1 if Tpre < 16C
> Surv = (5.43-0.28*Tpre) if 16 ? Tpre < 19
> Surv = 0.01 if TPre ? 19
>
> Where Tpre is the mean of daily maximum temperature (C) August–September.
>
> Scheuerell et al. (2006) developed a separate function for wild spring-run Chinook survival (see report for details).

Function Derivation

> expert opinion

Stressor Response Data



Stressor (X)	Mean System Capacity (%)	SD	low.limit	up.limit
14	100	0	0	100
15	100	0	0	100
16	95	0	0	100
17	67	0	0	100
18	39	0	0	100
19	1	0	0	100
20	1	0	0	100
21	1	0	0	100

Citations

Honea, J. M., Jorgensen, J. C., McCLURE, M. M., Cooney, T. D., Engie, K., Holzer, D. M., & Hilborn, R. (2009). Evaluating habitat effects on population status: influence of habitat restoration on spring?run Chinook salmon. Freshwater Biology, 54(7), 1576-1592.

Cramer, S. P. (2001). The relationship of stream habitat features to potential for production of four salmonid species. SP Cramer and Associates, Gresham, Oregon.

References

Honea et al. (2009) - https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-2427.2009.02208.x

Cramer (2001) - https://www.researchgate.net/publication/268284627_The_Relationship_of_Stream_Habitat_Features_to_Potential_for_Production_of_Fo