Scheuerell et al 2006: Temperature and Chinook Egg-to-Fry

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Species Information

Common Name: Chinook Salmon
Genus: Oncorhynchus tshawytscha

Stressor Details

Stressor Name: Temperature
Units: C
Metric: Mean Daily Temp During Incubation
Scale: linear
Function Type: continuous
Vital Rate/Process: Survivorship

Life Stage & Context

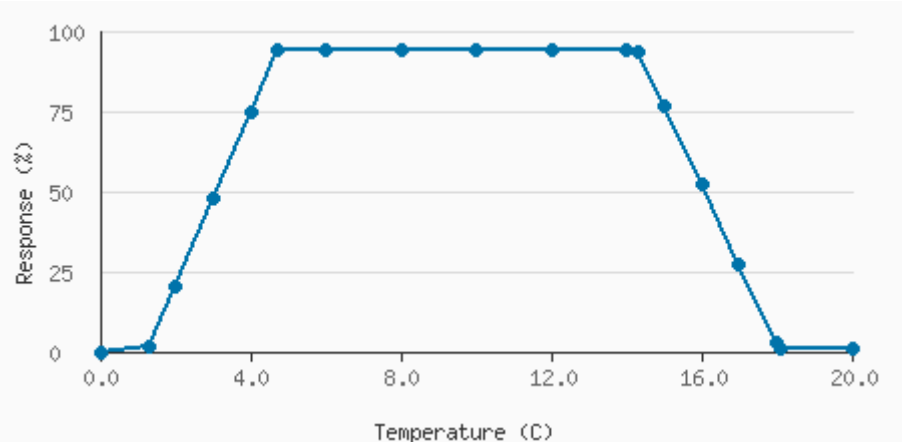
Life Stages: Egg
Geography: Oregon
Activity: Incubation
Season: Incubation

Descriptions

Overview

> Function applied in Honea et al., (2009) and Scheuerell et al. (2006) for life cycle model for wild spring-run Chinook salmon. Survivorship function from Scheuerell et al. (2006):
>
> Probability of egg-to-fry survivorship based on stream temperature where Tinc is the mean daily temp during incubation (Aug-May for their population):
>
> Tinc >= 1.3 & Tinc < 4.7: ((0.273*Tinc)-0.342)
> Tinc >= 4.7 & Tinc < 14.3: 0.94
> Tinc >= 14.3 & Tinc < 18.1: ((-0.245*Tinc)+4.44)
> Tinc >= 18.1: 0.01

Stressor Response Data



Raw Stressor Values	Scaled Response Values 0 to 100	SD	low.limit	up.limit
0	0	0	0	100

1.3	1.29	0	0	100
2	20.4	0	0	100
3	47.7	0	0	100
4	75	0	0	100
4.7	94	0	0	100
6	94	0	0	100
6	94	0	0	100
8	94	0	0	100
10	94	0	0	100
12	94	0	0	100
14	94	0	0	100
14.3	93.65	0	0	100
15	76.5	0	0	100
16	52	0	0	100
17	27.5	0	0	100
18	3	0	0	100
18.1	1	0	0	100
20	1	0	0	100

Citations

Scheuerell M.D., Hilborn R., Ruckelshaus M.H., Bartz K.K., Lagueux K.M., Haas A.D. & Rawson K. (2006) The Shiraz model: a tool for incorporating anthropogenic effects and fish-habitat relationships in conservation planning. Canadian Journal of Fisheries and Aquatic Science, 63, 1596–1607.

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.