

Scheuerell et al 2006: Temperature and Chinook Prespawn

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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
Geography: Oregon
Activity: Prespawn
Season: Late-Summer

Descriptions

Overview

Function applied in Honea et al., (2009) and Scheuerell et al. (2006) for life cycle model for wild spring-run Chinook salmon. Spawner stage: Survivorship of spring-run Chinook spawners and water temperature (from reviews by McCullough, 1999; and Richter & Kolmes, 2005). Water temperature-dependent survivorship function developed by Scheuerell et al. (2006) from observations by Cramer (2001) of wild spring-run Chinook.

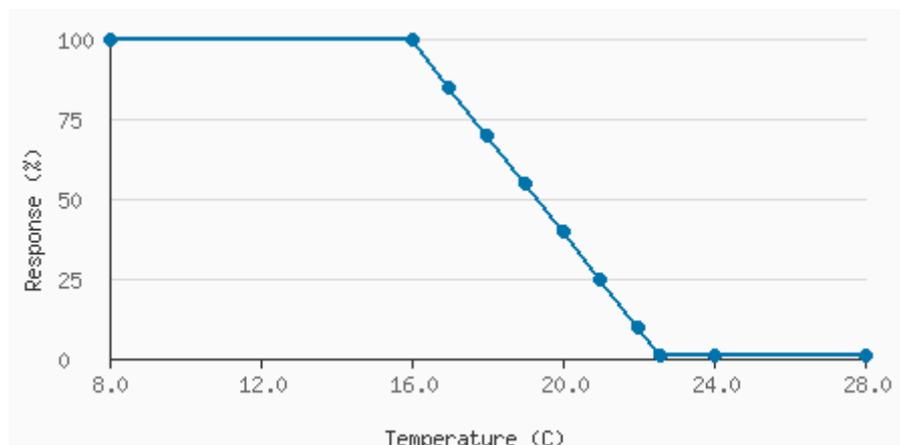
$Surv = 1$ if $T_{pre} < 16C$

$Surv = (1 - 0.15(T_{pre} - 16))$ if $T_{pre} \geq 16C$ & $T_{pre} \leq 22.6$

Where T_{pre} is the mean of daily maximum temperature (C) August–September. Honea et al., (2009) developed a separate function for hatchery spring-run Chinook survival (see report for details).

General Application Prespawn

Stressor Response Data



Raw Stressor Values	Scaled Response Values 0 to 100	SD	low.limit	up.limit
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8	100	0	0	100
16	100	0	0	100
17	85	0	0	100
18	70	0	0	100
19	55	0	0	100
20	40	0	0	100
21	25	0	0	100
22	10	0	0	100
22.6	1	0	0	100
24	1	0	0	100
28	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.