Scheuerell et al 2006: Temperature and Chinook Prespawn

Function Updated by mbayly on Mon, 11/25/2024 - 07:26.

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

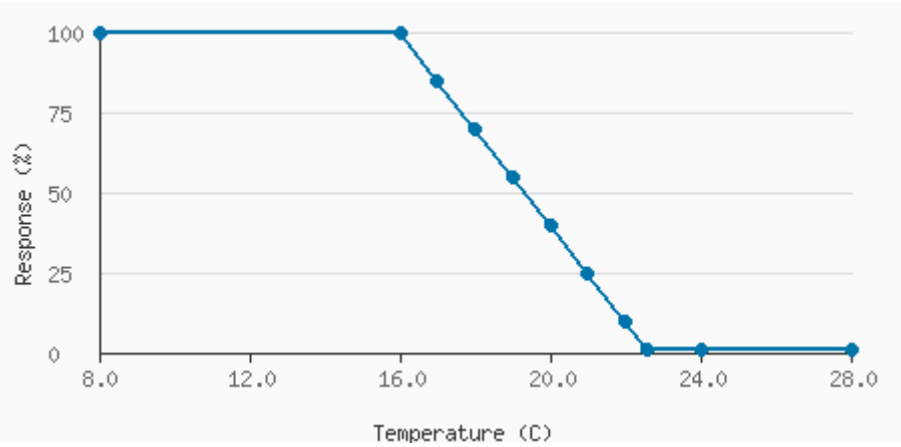
Life Stages: Spawners
Geography: Oregon
Activity: Prespawn
Season: Late-Summer

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 Tpre < 16C
> Surv = (1-0.15(Tpre-16)) if Tpre >= 16C & Tpre 22.6
>
> Where Tpre 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

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.