Summer Rearing Temperature and Westslope Cutthroat Trout

Species Information

Common Name: Westslope Cutthroat Trout
Genus: Oncorhynchus clarkii lewisi

Stressor Details

Stressor Name: Summer rearing temperature
Units: °C
Metric: July-August average stream temperature
Scale: linear
Function Type: continuous
Vital Rate/Process: Survival

Life Stage & Context

Life Stages: Parr
Geography: Laboratory, Montana
Activity: Rearing
Season: Summer (July, August)

Descriptions

Overview

> Westslope Cutthroat Trout inhabit primarily cold, high elevation watersheds where summer stream temperatures remain low. Summer stream temperatures may restrict the distribution of Westslope Cutthroat Trout through lethal or sublethal effects on growth, competition, and metabolism. Bear et al. (2007) compared the growth and survival of Westslope Cutthroat Trout and non-native Rainbow Trout in laboratory experiments. These experiments subjected fish to 60-days of temperatures from 8oC - 28oC. In these acclimated chronic exposure experiments, survival of fish under each temperature regime were monitored. The resultant data was fit to the follow logistic regression:
> p=97.07681+e-((T-19.6253)/-0.6151)
> Where T is the temperature that fish were held at for 60 days, and p is the survival probability.

Function Derivation

> Empirical data; Experimental manipulation

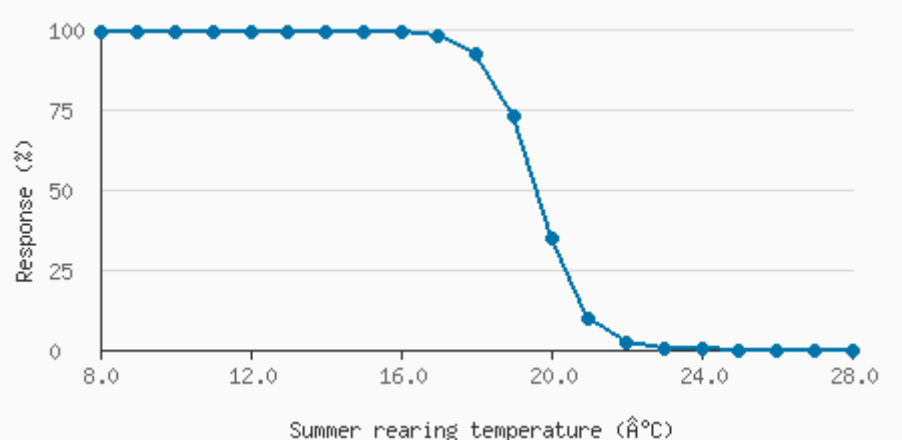
Transferability of Function

> This function was derived from laboratory experiments on wild stock Westslope Cutthroat Trout in Montana. It could be used on other populations of Westslope Cutthroat Trout with caution.

Source of Stressor Data

> This function has not yet been applied in a CEMPRA model. Recommended stressor magnitude data would reflect mean temperature during the two hottest months in each watershed.

Stressor Response Data



Temperature (7DADM)	Survival	SD	low.limit	up.limit
8	99.1	0	0	100
9	99.1	0	0	100
10	99.1	0	0	100
11	99.1	0	0	100
12	99.1	0	0	100
13	99.1	0	0	100
14	99.1	0	0	100
15	99.0	0	0	100
16	98.8	0	0	100
17	97.7	0	0	100
18	92.5	0	0	100
19	72.8	0	0	100
20	34.9	0	0	100
21	9.6	0	0	100
22	2.0	0	0	100
23	0.4	0	0	100
24	0.1	0	0	100
25	0.0	0	0	100
26	0.0	0	0	100
27	0.0	0	0	100
28	0.0	0	0	100

Citations

CEMPRA Team 2024. Relationship between stream temperatures and juvenile survival for Westslope Cutthroat Trout.

Bear, E.A., T.E. McMahon, A.V. Zale. 2007. Comparative Thermal Requirements of Westslope Cutthroat Trout and Rainbow Trout: Implications for Species Interactions and Development of Thermal Protection Standards. Trans. Am. Fish. Soc. 136: 1113-1121