Tapple and Bjornn 1983: Fines and Chinook Embryo

Function Updated by mbayly on Mon, 11/25/2024 - 06:30.

Species Information

Common Name: Chinook Salmon
Genus: Oncorhynchus tshawytscha

Stressor Details

Stressor Name: Sedimentation
Units: % smaller than 6.35mm
Metric: Substrate particles
Scale: linear
Function Type: continuous

Life Stage & Context

Life Stages: Egg
Geography: Idaho and Washington Streams

Descriptions

Overview

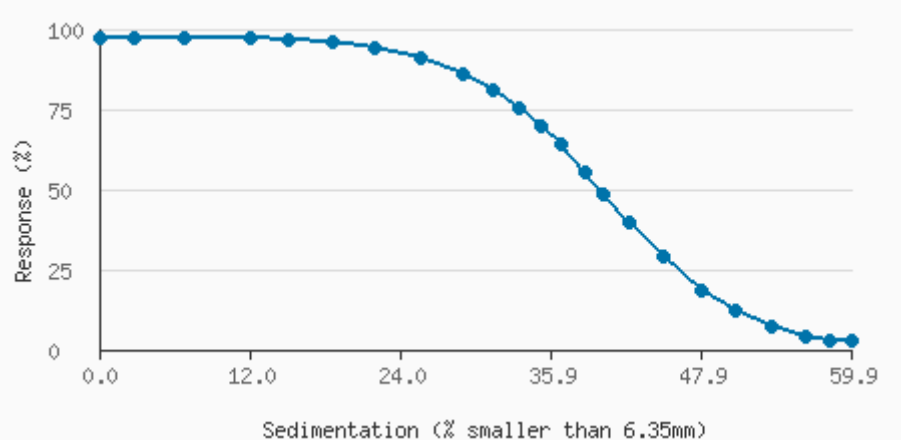
[Taken from figure caption] Relation between embryo survival and percentage of substrate particles smaller than 6.35mm for chinook salmon.
[Taken from paper] Redds that remain intact during incubation may become less suitable for embryos if inorganic fine sediments and organic materials are deposited in the interstitial spaces between the larger particles. The fine particles impeded the movement of water and alevins in the redd, and the organic material consumes oxygen during decomposition; if the oxygen is consumed faster than the reduced intragravel water flow can replace it, the embryos or alevins will asphyxiate.

Keywords: Fines. Fine substrate. Sedimentation

Function Derivation

field study

Stressor Response Data



Stressor (X)	Mean System Capacity (%)	SD	low.limit	up.limit

0.00	97.13	0.00	97.13	97.13
2.74	97.45	0.00	97.45	97.45
6.86	97.45	0.00	97.45	97.45
12.10	97.45	0.00	97.45	97.45
15.09	96.82	0.00	96.82	96.82
18.59	95.86	0.00	95.86	95.86
21.95	94.27	0.00	94.27	94.27
25.57	91.08	0.00	91.08	91.08
28.94	85.99	0.00	85.99	85.99
31.31	81.21	0.00	81.21	81.21
33.43	75.16	0.00	75.16	75.16
35.18	69.75	0.00	69.75	69.75
36.80	64.01	0.00	64.01	64.01
38.79	55.41	0.00	55.41	55.41
40.17	48.41	0.00	48.41	48.41
42.29	39.49	0.00	39.49	39.49
44.91	29.30	0.00	29.30	29.30
48.02	18.47	0.00	18.47	18.47
50.64	12.10	0.00	12.10	12.10
53.51	7.01	0.00	7.01	7.01
56.26	3.82	0.00	3.82	3.82
58.25	2.87	0.00	2.87	2.87
59.88	2.55	0.00	2.55	2.55
59.88	2.55	0.00	2.55	2.55

Citations

Bjornn, T. C., & Reiser, D. W. (1991). Habitat requirements of salmonids in streams. American Fisheries Society Special Publication, 19(837), 99. Tappel, P. D., & Bjornn, T. C. (1983). A new method of relating size of spawning gravel to salmonid embryo survival. North American Journal of Fisheries Management, 3(2).

References

https://www.for.gov.bc.ca/hfd/LIBRARY/FFIP/Bjornn_TC1991.pdf -
https://www.for.gov.bc.ca/hfd/LIBRARY/FFIP/Bjornn_TC1991.pdf