WDFW & Ecology 2004: HSI Coho Spawning Substrate

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Species Information

Common Name: Coho Salmon
Genus: Oncorhynchus kisutch

Stressor Details

Stressor Name: Substrate
Units: substrate class
Metric: Substrate class (1–9)
Scale: linear
Function Type: step
Vital Rate/Process: Habitat Suitability Index

Life Stage & Context

Life Stages: Spawners
Geography: Quinault River tributary, Washington
Activity: spawning
Season: Fall-early winter (spawning season)

Descriptions

Overview

Recommended spawning substrate preference for Coho Salmon used in Washington PHABSIM/IFIM instream flow studies. Values are the WDFW–Ecology 'Recommended Preference' for dominant substrate class (rescaled 0–1 to 0–100), not the calculated (observed) preference ranges from the 30 redds. Fine dominant substrates (silt, sand) and boulder/bedrock score 0; medium gravel to small cobble are optimal. In the source, full composite codes (ab.c) weight dominant and subdominant classes (RP = c·Pa + (1?c)·Pb) and score 0 where fines exceed 20% because of smothering of incubating eggs; only the dominant-class values are represented here, as a step function.

Stressor-response relationship data sourced from: TABLE 9. Coho Salmon (O. kisutch) Spawning Substrate Preference Data, Dewatto River and Fletcher Canyon Creek (2 studies, 30 redds) - Recommended Preference column (p. 36); same values as generic salmon spawning preferences in Table 1.

Dominant substrate class WDFW Table 1 codes:
1 silt/clay/organic;
2 sand;
3 small gravel 2.5–13 mm;
4 medium gravel 13–38 mm;
5 large gravel 38–76 mm;
6 small cobble 76–152 mm;
7 large cobble 152–305 mm;
8 boulder >305 mm;
9 bedrock

Function Derivation

Expert-adjusted recommended preferences informed by observed frequency-of-use (redd) data relative to availability.

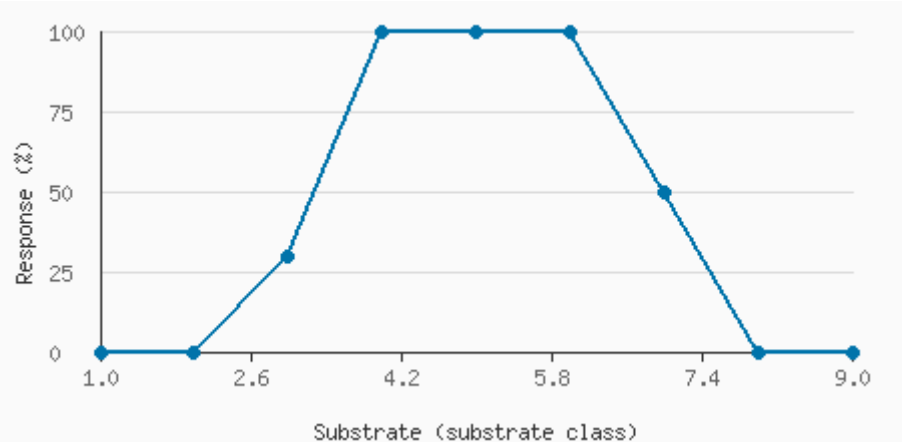
Transferability of Function

> Generic WDFW salmon spawning values; consult WDFW/Ecology before applying to local conditions.

Source of Stressor Data

> Redd microhabitat measurements (2 studies, 30 redds) compared with available habitat, following WDFW–Ecology instream flow study guidelines.

Stressor Response Data



Raw Stressor Values	Scaled Response Values 0 to 100	SD	low.limit	up.limit
1	0	0	0	100
2	0	0	0	100
3	30	0	0	100
4	100	0	0	100
5	100	0	0	100
6	100	0	0	100
7	50	0	0	100
8	0	0	0	100
9	0	0	0	100

Citations

Washington Department of Fish and Wildlife & Washington Department of Ecology. (2008). Instream flow study guidelines: Technical and habitat suitability issues including fish preference curves (Publication No. 04-11-007; updated April 5, 2004; error correction update February 12, 2008). Washington Department of Fish and Wildlife.

References

Beecher et al., 2002 - https://wdfw.wa.gov/sites/default/files/publications/00574/wdfw00574.pdf