Dissolved Oxygen and Plains Sucker System Capacity

Function Updated by mbayly on Thu, 04/24/2025 - 18:55.

Species Information

Common Name: Plains Sucker
Genus: Pantosteus jordani

Stressor Details

Stressor Name: Dissolved oxygen
Units: mg/L
Metric: D
Scale: linear
Function Type: continuous
Vital Rate/Process: Survival

Life Stage & Context

Life Stages: Adults
Geography: Saskatchewan-Nelson and Missouri River drainages
Activity: All activities
Season: All seasons

Descriptions

Overview

> Dissolved oxygen (DO) is measured as a concentration of $mg \cdot L^{-1}$. It is critical for respiration, and thus, fish survival. For Plains Sucker, DO tolerances have not been tested experimentally and without biomass data from natural populations, upper and lower thresholds are difficult to estimate. The lower bound for this SR function was determined by the lowest oxygen concentration at which Plains Sucker were found (~ $2 mg \cdot L^{-1}$).

Function Derivation

> Expert opinion; Landscape correlation

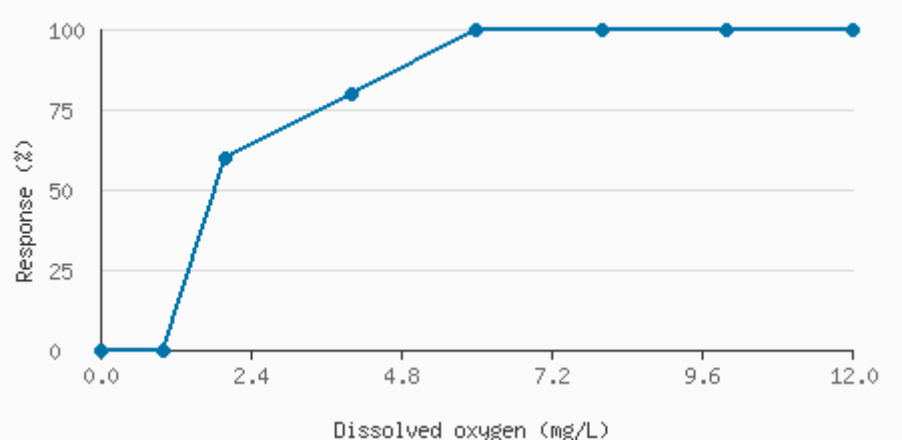
Transferability of Function

> This stressor-response function is suitable for use on Plains Sucker populations within the Missouri River drainage and the Saskatchewan-Nelson River drainage in Canada; however, Milk River populations are subject to increased flows annually from April-October and may have adapted differing physiologies accordingly. Since Plains Sucker and the Cordilleran Sucker used to belong to a single species, Mountain Sucker, it may be reasonable to assume they have similar tolerances to DO; however, this has not been studied, so caution should be taken. Little is known about the physiological similarities between Plains Sucker and other catostomids and caution should be taken when using this function on other species.

Source of Stressor Data

> Practical application of the SR function necessitates that users obtain estimates of stressor magnitude (level) in the target system. Currently we only have DO data for a single site that contains Plains Sucker across its distribution. More data is being collected by Fisheries and Oceans Canada.

Stressor Response Data



Dissolved_O2	Mean System Capacity (%)	SD	low.limit	up.limit
12	100	0	0	100
10	100	0	0	100
8	100	0	0	100
6	100	0	0	100
4	80	0	0	100
2	60	0	0	100
1	0	0	0	100
0	0	0	0	100

Citations

Jarvis, L. 2022. Dissolved oxygen stressor-response function for Plains Sucker. Department of Fisheries and Oceans CEMPRA model for Plains Sucker.