Relationship Between Stream Discharge and Dissolved Oxygen Levels at Canyon Creek, and Implications Towards Salmon Development and Physiology

INTRODUCTION

Stream discharge = velocity * water depth * wetted width

Dissolved oxygen refers to the level of free oxygen present in water and plays a role in salmon development and physiological function.

Purpose: To determine if there is a relationship between stream discharge and dissolved oxygen levels.

HYPOTHESES

H_0: No significant correlation between stream discharge and dissolved oxygen levels

H_1: A significant correlation between stream discharge and dissolved oxygen levels

METHODS

PREDICTION

Ripple sites O_2 > still sites O_2 due to constant O_2 replenishment with constant flow

RESULTS

• The difference in oxygen levels and stream discharge between ripple and still sites is significant, as well as the positive correlation between oxygen and stream discharge levels (null hypothesis rejected)

• In slow-flowing sites (still), oxygen levels are depleted due to decomposition and consumption by the organisms that inhabit the stream. In faster-flowing water sites (ripple), oxygen levels get replenished, as the water has more contact with air.

• A previous study found that higher oxygen levels → higher embryonic survival rates (minimum of 7 mg/L).

• The study also found correlation between water velocity, embryonic survival and dissolved oxygen levels. Higher stream discharge → higher dissolved oxygen → higher embryonic survival.

• Decrease in salmon population → less trophic productivity and less food for consumers of salmon.

CONCLUSION & FUTURE DIRECTIONS

• For future studies: take into account other environmental factors that can also influence oxygen levels, such as water temperature, gravel composition, water murkiness, etc., use more precise equipment, and obtain larger sample size.

• These findings can allow us to determine if a stream has adequate conditions for optimal salmon performance and reproduction.

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Bowen Dou, Yalda Hosseini, ChaeEun Lee, Crista Rosenberg, Nicholas Wu

1 University of British Columbia