

# DECLINE OF SKOKOMISH NATION SPOT SHRIMP CATCH IN LOW DISSOLVED OXYGEN WATERS OF THE HOOD CANAL, PUGET SOUND, STATE OF WASHINGTON

This study examined the hypothesis that the decreasing number of spot shrimp caught by the Skokomish tribal fishers was related to the areas of documented decreasing dissolved oxygen levels within the treaty fishing area of the Skokomish Indian Nation (Hood Canal). Dissolved oxygen levels recorded and sampled by state, citizen and tribal entities were compiled into a database. The recorded dissolved oxygen levels were then sorted into catch areas set by the Washington State Department of Fish and Wildlife. Catch volume was then compared to areas of low dissolved oxygen. Results show that since the summer of 2001, tribal treaty catch of spot shrimp has declined significantly in the lower portion of the Hood Canal (Anna's Bay), where the dissolved oxygen levels have been steadily decreasing.

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## INTRODUCTION

We hypothesized that the amount of treaty-caught spot shrimp by the Skokomish Nation fishers has declined since 2001, possibly as a result of decreasing dissolved oxygen levels in the southern regions of the Hood Canal. Aquatic life needs 5–20 parts per million (ppm) oxygen for sustainability; <5 ppm causes biological stress, and <3 ppm kills fish. Low dissolved oxygen levels have been hypothesized to be caused by failing septic tank systems along the Hood Canal's waterfront, agricultural waste, current forest management practices, algae blooms, storm water runoff, and salmon carcasses.<sup>1</sup> Oxygen depletion in the Hood Canal occurs as products rich in nitrogen (septic waste for example) decompose depleting oxygen.

Spot shrimp are a traditional food of the Skokomish people. Spot shrimp are high in tryptophan; selenium; protein; vitamins D, B12, and B3; iron; phosphorus; omega 2 fatty acids; zinc; copper; and magnesium.<sup>2</sup> During the catch season, shrimp are a staple food of the Skokomish people. Spot shrimp are also an economic resource for the tribe.

## MATERIALS AND METHODS

The tribal spot shrimp catch database was compiled for April, May, June, and July of 2004. April and June were compiled from 2005.<sup>3</sup> From these data, three transects were identified in the Hood Canal. Shrimp are bottom dwellers, so for this study only dissolved oxygen data from the bottom sample depths were entered into the database. Washington State Department of Ecology and the Citizen Monitoring Pro-

gram dissolved oxygen data<sup>4</sup> were compiled for the same three transects at the bottom depths of the Hood Canal and the same months. Both sets of data were graphed and compared.

## RESULTS

Skokomish tribal catch datasets point to lower shrimp catch in documented areas of low dissolved oxygen within the Hood Canal; however, further research is needed. The low dissolved oxygen phenomenon appears to be most extreme in the lower end of the Hood Canal (Anna's Bay and Lynch Cove) during the summer months. The middle section of the Hood Canal (north of Potlatch) has dissolved oxygen levels that generally provide adequate oxygen for marine life; although in the summer months, some areas are at levels that could pose biological stress. The northern end of the Hood Canal (north of the Hamma Hamma River) is the only area in the Hood Canal that dissolved oxygen is adequate year round for aquatic life. From the dissolved oxygen and shrimp data sets, Skokomish fishers are advised to set their shrimp pots in the northern regions of their treaty waters to ensure substantial catch numbers.

## REFERENCES

1. Puget Sound Action Team. Preliminary actions and corrective assessment plan on Hood Canal. 2003. Available at: [http://www.psat.wa.gov/Publications/PACA\\_html/paca\\_ex\\_summary.htm](http://www.psat.wa.gov/Publications/PACA_html/paca_ex_summary.htm).
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