The inclusion of toxic exposures in a population model of Chinook salmon (*Oncorhynchus tshawytscha*) in the Duwamish/ Green River

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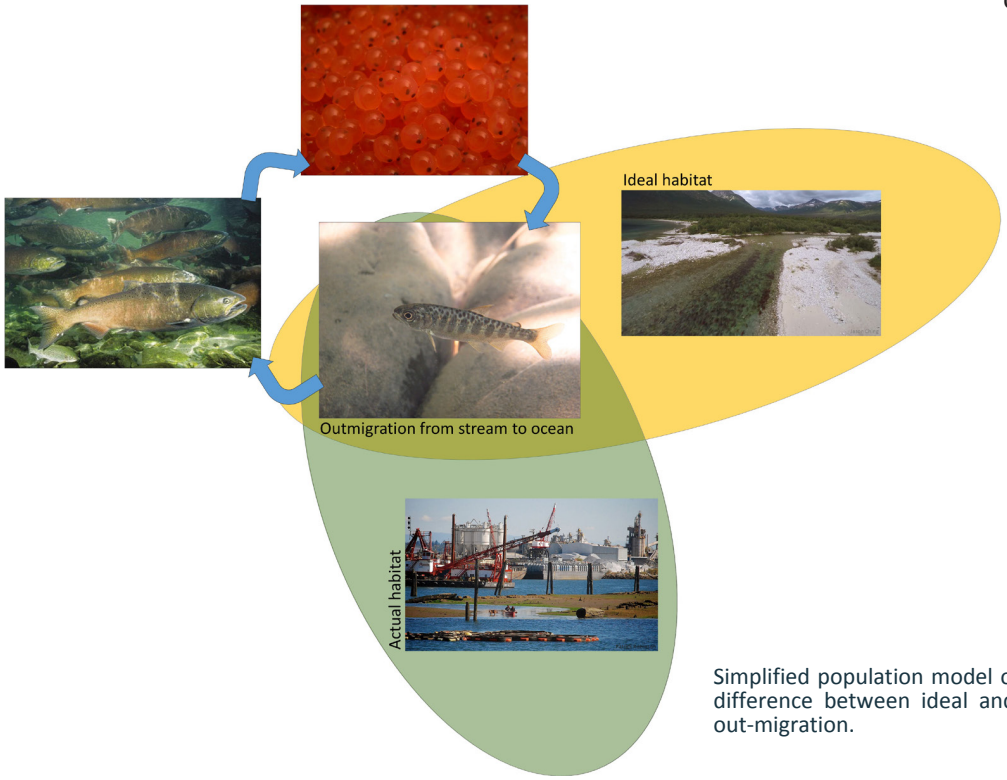
- Salmon habitat degradation is widely considered a major cause of salmon declines; yet, the influence of chemical contamination is poorly understood.
- The study will address the impact of sublethal toxic insult at the population scale on Chinook salmon (*O. tshawytscha*) in the lower Duwamish Waterway.

Salmon are a keystone species with a biological foundation that spans from coastal ecosystem health to human economies. Water pollution is becoming an increasingly important salmon conservation issue, particularly in watersheds affected by toxic runoff from urban development, industrial activities, and impervious surfaces such as roads. The physiologic effects of many toxic substances are well studied, however the population-level effects are more challenging to evaluate due to differences in life history strategies.

Toxic exposures are often not included in population abundance evaluations, particularly sub-lethal exposures. The purpose of this study is to quantify the impacts of sublethal toxic insults, such as changes in growth and immune function, on Chinook salmon (*Oncorhynchus tshawytscha*) in the Duwamish/ Green River resulting from exposures to contaminants in the lower Duwamish Waterway. The population model will incorporate information on stage-age structure, reproductive stages, time to reproductive maturity, and life span, as well as proportion of each stage in areas along the study site, based on an extensive review of literature specific to Chinook salmon in the Duwamish/Green River.

Routes, concentrations, and likelihood of exposure will be determined incorporating stage-specific feeding/ rearing locations, and migration habits with contaminant concentration distribution along the study site. Toxicity will be determined by mechanism of action, and sub-lethal effects dose-response relationships. Model scenarios will investigate the impact of toxic insults at specific life history stages on population abundance. Extrapolations of this model can be applied to Chinook salmon populations throughout the Salish Sea to evaluate sound-wide impacts and to track the effectiveness of ecosystem recovery efforts.



Simplified population model of Chinook salmon demonstrating the difference between ideal and actual habitat encountered during out-migration.

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RECOMMENDED CITATION

Lundin, J., Spromberg, J.A., Johnson, L.L., Baldwin, D., Hoff, R., Neely, R., Baker, T., O'Neill, S.M., and Scholz, N. (2017) The inclusion of toxic exposures in a population model of Chinook salmon (*Oncorhynchus tshawytscha*) in the Duwamish/Green River. p. 45 In 2016 Salish Sea Toxics Monitoring Review: A Selection of Research. Edited by C.A. James, J. Lanksbury, D. Lester, S. O'Neill, T. Roberts, C. Sullivan, J. West. Puget Sound Ecosystem Monitoring Program. Tacoma, WA. 68 pp; https:// www.eopugetsound.org/sites/default/files/features/resources/ PSEMP_2016_ToxicsSynthesis% 202017.05.09.pdf