A Spatial Analysis of Urban Runoff Mortality Syndrome in Coho Salmon *(Oncorhynchus kisutch)* in Puget Sound.

Cameron Artz, Matthew Kelley PhD

Urban Runoff Mortality Syndrome (URMS) in Coho salmon *(Oncorhynchus kisutch)* is characterized as gaping for air, loss of equilibrium, finning, and eventually premature death before successful spawning. This newer phenomenon is not yet well understood, yet more recent studies are beginning to identify roads and nonpoint-source pollutants as the main contributors. We use GIS to summarize urban conditions of impervious surfaces and road density within watersheds and determine whether there is a correlation between these urban conditions and the mortality rates found within them. This analysis will focus on the greater Puget Sound area where mortality research has been conducted, specifically King, Snohomish, Pierce, and Kitsap counties. Analysis required a wide range of GIS data including watershed boundaries, Digital Elevation Models, road networks, and impervious surface rasters, as well as field data recorded on Coho mortality. Statistical analysis showed a strong correlation between coho mortality and imperviousness within watersheds (R^2=0.584). The correlation between road density and coho mortality rates is even stronger (R^2=0.601).The results of this study indicate that dense road networks and impervious surfaces have strong negative impacts on Coho salmon survival and spawning success. However, simple and cost-effective solutions such as rain gardens and green stormwater infrastructure can make significant improvements in stormwater quality.