Characterization of Contaminants of Emerging Concern in Regional Waters

The goal of this project was to sample water and shellfish tissue to measure where (and to what levels) man-made chemicals are occurring, so that we can understand if they might cause some harm to fish and wildlife.

Project outcomes

We collected samples from Puget Sound marine waters, shellfish, and creeks and analyzed them utilizing high resolution mass spectrometry methods and were able to characterize dozens of Contaminants of Emerging Concern (CECs) that had not been previously seen. Samples were collected at a range of locations (18 in Puget Sound, 5 lowland creeks, and 15 mussel sites) and during both the wet and dry seasons so that we could understand not only where the chemicals were occurring, but also how the occurrence patterns and potential sources may have changed over time.

We also performed toxicological screening for the identified chemicals by comparing the levels we measured in the environment, to levels that are known to cause some sort of harm in fish or other aquatic species. It that way we were able to identify those chemicals that were most important. There is a short-list of approximately 20 priority CECs.

FUTURE OPPORTUNITIES

We are using the information from this work to help focus future management and regulations to address those chemicals that are most important. This is being done in several ways including the Puget Sound Ecosystem Monitoring Program CEC prioritization work, the NEP Toxics in Fish recovery planning efforts (aimed at reducing harm caused by toxic chemicals in marine animals), and the Southern Resident Killer Whale task force. We ultimately want to help keep harmful chemicals out of the environment.

These results have increased our understanding of when and where CECs occur in the environment and have provided a strong technical basis for further effects-based investigation to identify which CECs might be directly responsible.

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The first of our project-related publications is here: https://pubs.acs.org/doi/10.1021/acs.est.9b06126