

## **Project Abstract/Summary**

**Title: MERHAB: Clear and present danger: monitoring and management of lipophilic shellfish toxins in Washington State**

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Total proposed cost (no shiptime): \$700,525; Budget Period: Sept. 1, 2015-Aug 31, 2018

*Introduction* - Lipophilic shellfish toxins comprise an extensive suite of compounds including those associated with the human syndromes known as diarrhetic shellfish poisoning (DSP) and azaspiracid shellfish poisoning (AZP). As a result of recent bloom events and subsequent human intoxications in Washington State (USA) due to DSP, there is a critical and urgent need for State public health officials to be able to monitor and accurately quantify harmful algal bloom (HAB) species associated with DSP and azaspiracid shellfish poisoning (AZP) and their toxins. There is now evidence that lipophilic toxins associated with DSP and AZP are present in water and/or shellfish, including oysters and mussels from Puget Sound and razor clams from the WA coast.

*Rationale* – State agencies (e.g., Washington State Department of Health; WDOH), responsible for ensuring shellfish safety, have requested an interlaboratory comparison of DSP toxin analysis and an assessment of the risk of AZAs in WA State shellfish. In 2010, the phytoplankton monitoring program, SoundToxins, recorded *Dinophysis* abundance in Sequim Bay, WA, at 298,000 cells/L – one of the highest densities of *Dinophysis* ever recorded worldwide. Although several algal species associated with DSP have been recorded in WA waters for at least the last 10 years, information about their spatiotemporal distribution and toxicity is limited. In the case of AZAs, nothing is known about the organism(s) producing these toxins in US waters, however these toxins have been found in the water and/or shellfish at concerning levels (*ca.* 60 µg/kg) in Puget Sound shellfish. *Objectives* - The objectives of the proposed study are to: 1) Identify and spatio-temporally characterize the distribution of phytoplankton species that produce DSP toxins and azaspiracids accumulating in Washington State shellfish, 2) Establish and validate a tiered early warning system for DSP and AZP events, including routine microscopy by SoundToxins/ORHAB partners, and rapid toxin screening in seawater and shellfish, 3) Assist State managers in establishing globally accepted protocols for quantifying lipophilic toxins as part of their biotoxin monitoring program, 4) Inform and educate stakeholders about lipophilic toxin risk and management with the goal of transitioning the project to State funding at the end of 3 years. *Approach* - Tight partnership with WDOH, the SoundToxins program, Olympic Region Harmful Algal Blooms (ORHAB) partnership, and Puget Sound shellfish growers (including the Jamestown S’Klallam tribe and other tribal representatives) will facilitate the study of the seasonal variability of lipophilic toxins and toxin-producing species at 10 geographically-distinct sites within Washington State waters where seawater or shellfish have recently been contaminated with these toxins. Stakeholder support throughout the project will ensure the transition of this project to the State at the end of 3 years as we have successfully demonstrated with ORHAB. Implementing routine lipophilic biotoxin monitoring will be a critical first step towards ensuring public safety while also enabling Washington State shellfish growers to sell their product to the European Union once trade is re-established.