

Acute and Chronic Effects of Crude Oil and Dispersed Oil on Chinook Salmon Smolts

The specific aims are:

1. To develop a closed, flow-through test system for exposing salmon smolts to declining concentrations of the WAF or CEWAF (using the dispersant Corexit 9500) of PBCO.
2. To conduct field-modeled laboratory exposures of salmon smolts to declining concentrations of the WAF or CEWAF of PBCO, with the goal of determining the starting concentrations that induce metabolic stress, narcosis, and mortality; metabolic stress will be assessed using an advanced nuclear magnetic resonance (NMR)-based metabolomics approach.
3. To determine the long-term growth and metabolic viability of the acutely exposed fish by culturing them in clean (oil- and dispersant-free) seawater.

This project addresses the desire of the OWCN to investigate the effects of oil on wildlife. It will address applied questions regarding the risk of oil to endangered species, as well as basic questions concerning mechanisms of oil toxicity to salmon early life stages – using state-of-the-art tools. Due to the large maritime transport of crude oil from Alaska to California, there is significant potential for a catastrophic spill that could seriously impact salmon populations, particularly if it occurred when smolts are entering the ocean from native streams. In addition, the National Marine Fisheries Service and the CDFG Office of Spill Prevention and Response have indicated that obtaining an understanding of the impacts of spill remediation to fisheries of endangered anadromous species is of great importance. Currently, there is limited information available on the effects of oil or chemically dispersed oil on anadromous fish smolts. Therefore, this project will provide spill responders with basic information on the acute and chronic effects of oil spills on migrating salmon, and data to support decisions regarding the advisability of applying dispersants under spill conditions where migrating salmon are present.

