

Assessing the Acute and Sublethal Effects of oil and Dispersed oil to Sensitive Cnidarian-algal Symbioses

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When oil is spilled into near-shore waters responders often face a difficult choice regarding the best response option to choose. Response options are often a trade-off between different species and habitat impacts and are based on toxicity data, recovery projections and localities of sensitive or protected species. For example, using chemical dispersants may protect mangroves but potentially impact the sub-tidal coral reefs that previously would have received little or no impact from an overlying spill. Our research focuses on providing sound scientific data on the effects of oil and dispersed oil on sensitive cnidarian-algal symbiotic species, including corals, to aid in this decision making process. To initiate these studies we have used the temperate sea anemone *Anthopleura elegantissima* as a model of this sensitive cnidarian-algal symbiosis. Anemones were exposed to realistic short-term (8 hour) acute doses of various dilutions of water accommodated fractions (WAF) and chemically enhanced WAF (CEWAF) of weathered Arabian Light crude oil using standard CROSERF techniques. Injury was determined using a multi-tiered approach employing an array of metrics from acute endpoints (e.g. mortality) to behavioral and biochemical assays. Detailed chemistry (TPH, total petroleum hydrocarbons and 53 single PAHs) on the exposure water was carried out. The aim of these acute experiments was to assess the appropriate dose range for a longer-term detailed exposure to assess the potential for delayed and sublethal effects. Mortality was not observed even at the highest dose after 8 hours of exposure in either the WAF or CEWAF exposures. However, tentacle and column expansions were significantly reduced in the higher CEWAF (not WAF) exposures. In addition visual and quantified production of mucus increased with dose, particularly in the CEWAF exposures. Clearly exposure to CEWAF is detrimental to anemones at higher doses, and potentially lethal if exposure periods exceed 8 hours. The potential long-term and delayed effects in *Anthopleura elegantissima* and the soft coral *Xenia elongata* will be assessed in upcoming experiments.

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