

Monitoring oil spill bioremediation using marsh foraminifera as indicators

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A controlled experiment is in progress to identify the impacts of an oil spill on a coastal salt marsh and to evaluate *in situ* biological remediation techniques to help restore the environment. Marsh microfossils known as foraminifera (forams), a group of Testate Rhizopods, are highly susceptible to such types of environmental pollution, and are being used to monitor the effects of the oil spill and the treatments.

The project, run by the Department of Fisheries and Oceans (DFO) and funded by the United States Environmental Protection Agency (EPA), is situated near Petpeswick Inlet on Conrods Beach, along the Eastern Shore of Nova Scotia. Plots were laid out and weathered crude oil was applied to the surface of the designated plots in early June at low tide. Six different treatments are being used in triplicate for a total 18 plots, including a control plot (no treatment), an oiled plot (natural attenuation), and plots with the enrichment of nutrients, cut plants and/or agricultural disking. Each plot is divided into a grid. Based on a statistical design, one centimeter thick samples are taken from the field with a metal

10 cc core, so that no one square within the grid is sampled twice. This was done bi-weekly for the first two months and monthly for the last three months until the end of October. The samples are then sieved, processed and analyzed under a stereomicroscope in a lab to determine the types of species, the number of living vs. dead, and normal vs. deformed populations. The forams observed are one-celled micro-organisms that secrete a siliceous test of mico- to meio-fauna size (between 63 – 500 μ m), that remains in the surface sediment record in a large abundance (400–4000 species per sample).

Results suggest that the oil has had an impact on at least one particular species, *Miliammina fusca*. A very high percentage is deformed in comparison to non-oiled specimens. The treated plots should reverse this type of effect, and show recovery in the spring. A recovery of this manner would imply the effectiveness of the bioremediation treatments, and provide counter-measure strategies suitable for oil-contaminated coastal salt marsh environments.