

**IN SITU PHYTOREMEDIATION OF HYDROCARBON CONTAMINATED  
LAGOON SEDIMENTS USING PHRAGMITES AUSTRALIS**

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Horsea lagoon is a 25 m wide by 75 m long, semi saline, shallow tidal lagoon located in Hampshire, U.K. It is contaminated with up to 94,400 mg/kg total petroleum hydrocarbons (TPH) after receiving contaminated wastewater runoff from a large scale fire fighting facility for approximately 50 years.

Conventional soil remediation methods are expensive and normally require the addition of more chemicals or the removal of large areas of polluted land which can be damaging to the surrounding ecosystem. Phytoremediation is the use of plants and their associated micro-organisms for enhancing the remediation of polluted environments.

This three year study aims to evaluate the potential for full scale, in situ, phytoremediation and make suggestions for a remediation strategy for Horsea lagoon. In May 2009, after a successful one year microcosm trial to determine the most appropriate plant species, *Phragmites australis* was planted at Horsea lagoon. Regular bi-monthly sampling has since been carried out to determine the levels of Total Petroleum Hydrocarbons (TPH) contained in the sediment and whether the addition of *Phragmites australis* decreases this level over time. In addition to this, greenhouse microcosms, using contaminated sediment from Horsea lagoon and small clumps of *Phragmites australis*, are being sampled monthly to help determine the mechanisms of hydrocarbon breakdown and the relative contribution of the microbes and root zone to this overall process.

In the UK alone, there are approximately 120,000 contaminated petrol station sites, not including oil terminals and refinery sites. The outcomes from this study can help to form phytoremediation strategies for these hydrocarbon contaminated environments and others such as: old fire fighting training sites, old Naval sites, sites of fuel spills and leaks, oil fields and oil drilling sites.

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