

Presentation title: Contamination from historic coastal landfills

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This presentation will communicate the risk of pollution from historic coastal and estuarine landfills. 1264 historic landfill sites around England are in coastal and estuarine locations that are low-lying and at risk of flooding if not adequately protected by flood defences. In South East England there are a number of flood defences that are themselves constructed from landfill waste. At some locations a hold-the-line management policy is being applied to the defences when managed realignment would be the preferred policy if landfill waste was not present. With the predicted increase in sea level, extreme weather events and coastal erosion due to climate change, it is increasingly likely that coastal and estuarine landfills will be subject to inundation or breached, which could result in the release of contaminants through leaching or direct release of waste to the intertidal zone.

The aim of this project was to characterise the contaminant load of the waste material present at two historic coastal landfill sites and consider its impact on sediment quality if the landfills were breached. The sites selected for investigation were Hadleigh Marsh (waste filled) flood embankment and Leigh Marshes (a recreational area created from a former landfill and protected by a flood embankment) in Essex. These sites were selected as the defences have current life expectancies of approximately 20 years and the Hadleigh Marsh embankment is protecting an area identified by the Environment Agency as suitable for the creation of intertidal habitat through de-embankment. The majority of the measured contaminant concentrations in the waste exceed Canadian Interim Sediment Quality Guidelines, and many exceed the Probable Effect Levels (fig 1), indicating there would be an adverse effect on sediment-dwelling flora and fauna around the landfill sites if waste materials erode. The effects of inundation of these sites by river and seawater has also been investigated, and it has been found that significantly higher percentages of most metals are mobilised in seawater (fig 2). This suggests that increased saline intrusion due to sea level rise will result in increased concentrations of metals leaching from the sites. These findings will be significant in influencing sustainable management strategies at historic coastal and estuarine landfill locations. The next stage of this project will be to investigate the vulnerability of historic coastal and estuarine landfill sites to climate change pressures.

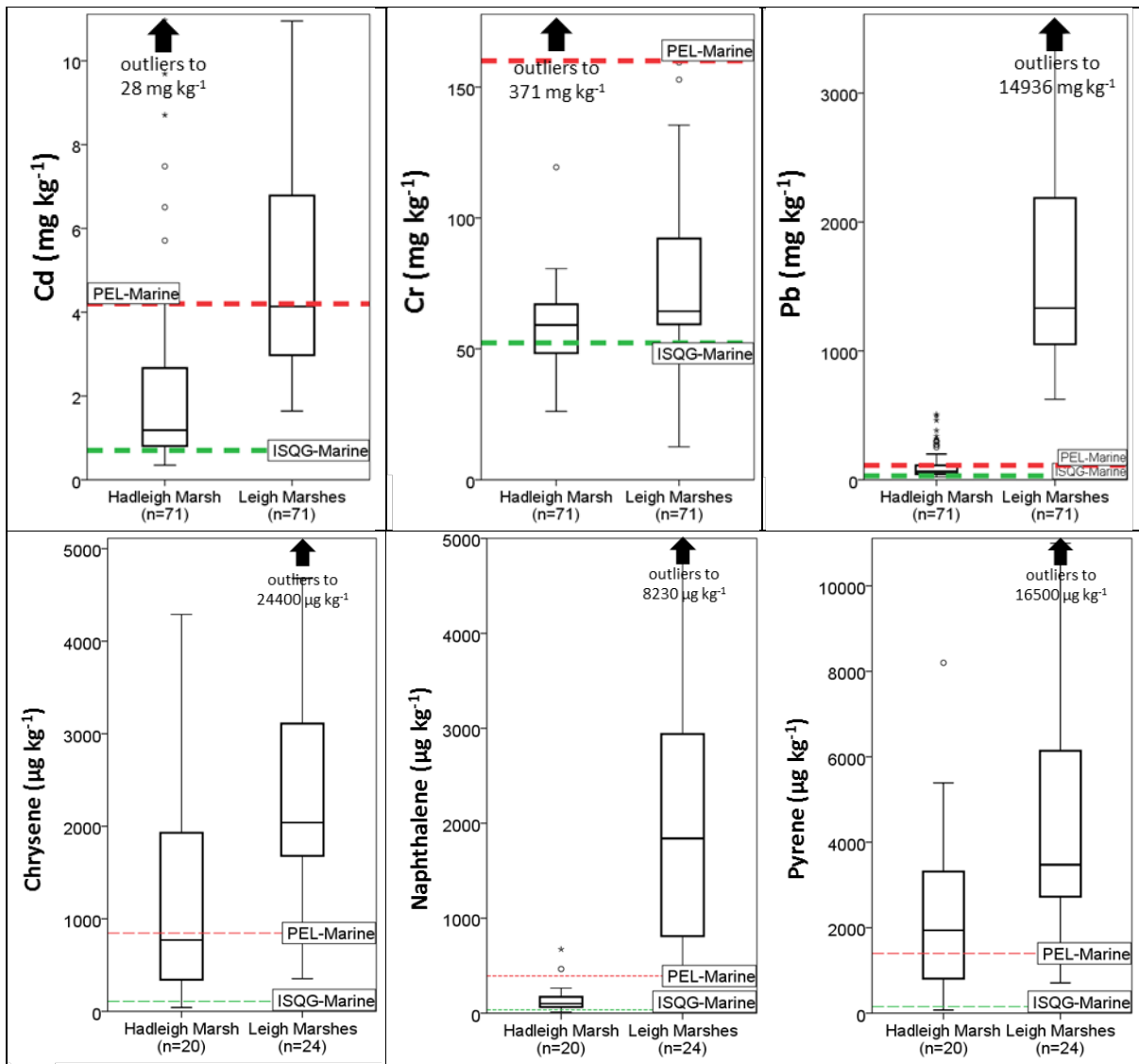


Figure 1: Contaminant levels in the < 2 mm fraction of landfill matrix material excavated from two estuarine landfills compared to Canadian interim marine sediment quality guidelines

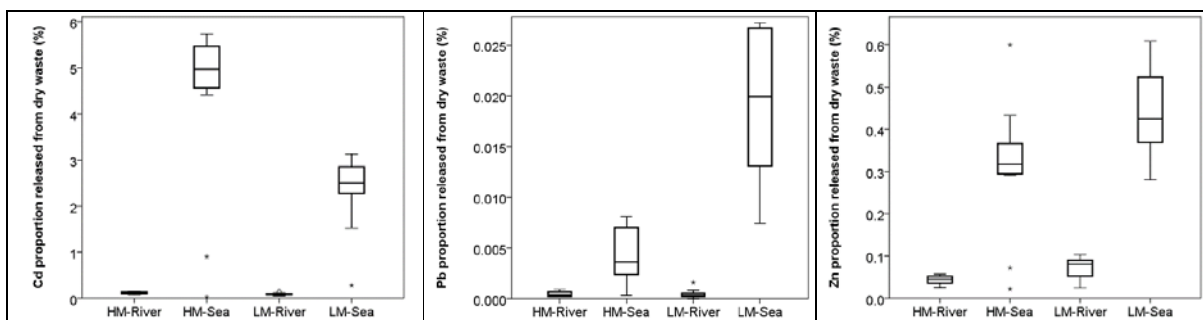


Figure 2: Comparison of contaminant release from the < 4 mm fraction of landfill matrix material in river water and seawater leaches (HM = Hadleigh Marsh waste filled embankment, LM = Leigh Marshes landfill)