Assessment of levels of trace metal contaminants in sediments at Rame Head

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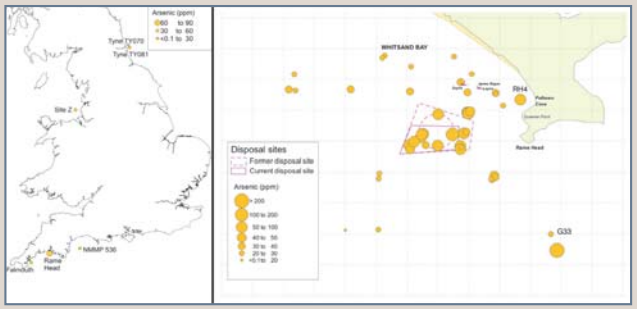
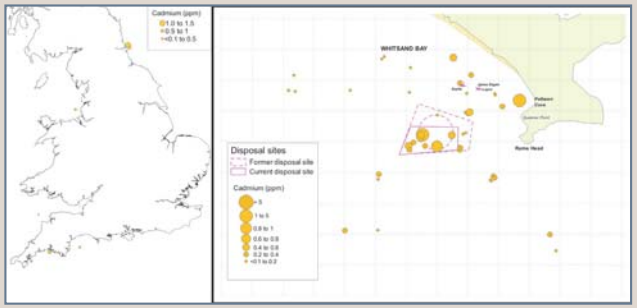
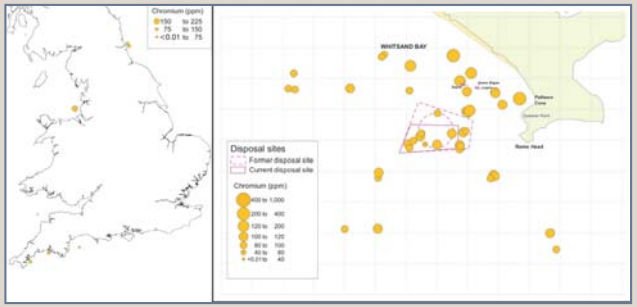
Metals and Tributyltin (TBT)

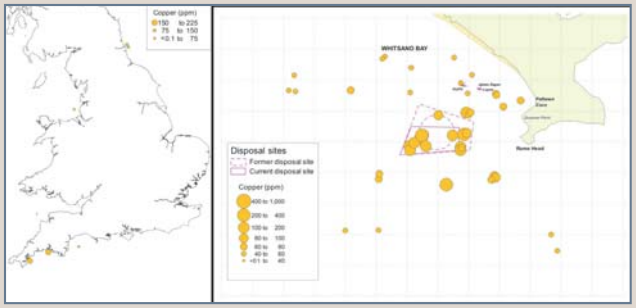
The <63 µm fraction of the sediment was analysed to determine each metal concentration; several of these are presented below. TBT analysis was completed on whole sediment.

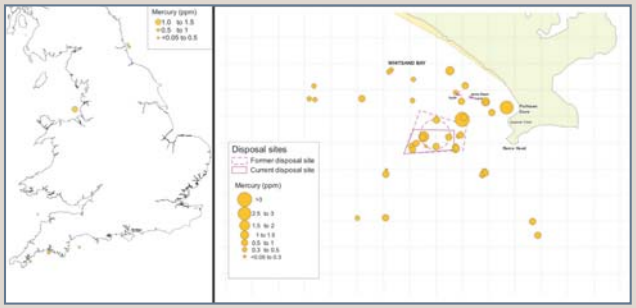
Maps of concentrations at other UK disposal sites and concentrations recorded at NMMP site 536 are also given for context.







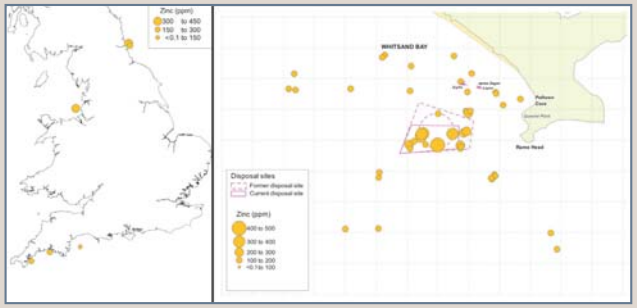


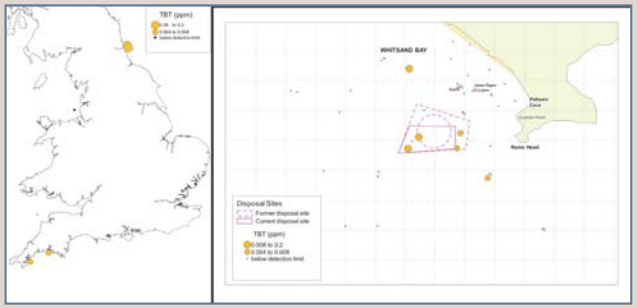


There are three areas that appear to have elevated metal concentrations:

1. **Disposal site**
   Elevated: Arsenic, Cadmium, Copper, and Zinc
   Concentrations of these contaminants in the source dredge material are known to be elevated.
2. **Inshore, near Polhawn Cove in Whitsand Bay**
   Elevated: Mercury, Chromium, Cadmium (1 sample, RH4)
   Concentrations are similar to those found at the disposal site and may reflect:
   - Short-term deposition of dredged material
   - Inputs from other anthropogenic sources
   - Naturally elevated concentrations of these elements.

   The sediment in this area is very well-sorted unimodal sand, containing <1% of silt/clay material (<63 µm). Note that these concentrations were measured on the silt/clay fraction only, so are of relatively low significance for the whole sediment.
3. **Southeast of the disposal site (G33)**
   Elevated: Arsenic (1 sample)
   Reasons for this result are not immediately clear. The relative significance of this is low, because most marine biota convert arsenic into arsenobetaine (a non-toxic form of arsenic), so that these concentrations in tissues pose little risk to marine life (Francesconi & Edmonds, 1997).





Conclusions

- Trace metal concentrations are generally consistent with concentrations found at other UK dredged material disposal sites.
- The trace metal concentrations found at or near the Rame Head disposal site are generally higher than those found at the nearest NMMP site (no. 536), 50 km offshore in 46 m of water. Cefas' results are similar with the data from British Geological Survey catchment model (presented in Ridgeway et al., 2005) which were interpreted as a result of the natural regional geology and mining history.
- TBT concentrations are all below the detection limit for TBT (0.001 ppm) except for 2 samples, 0.153 ppm at G18 (within the disposal site), and 0.009 ppm at G36 (on the N side of the disposal site).

References

Francesconi, K.A & Edmonds, J.S. (1997) Arsenic and marine organisms. Advances in Inorganic Chemistry, 44: 147-189.

Ridgway, J., Breward, N., Lister, T. R., Mackenzie, A. C. & Vane, C. (2005) Background levels and the anthropogenic component of naturally-occurring elements in marine sediments subject to dredging and disposal. British Geological Survey, Commissioned Report, CR/04/266. 121 pp.

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