

Why dredge?



As an island nation, the UK has economic and social needs to provide safe passage, trade routes and access for recreation and tourism throughout its marine waterways.

There are a variety of users of our marine environment who rely on navigable waterways. Around England and Wales there are approximately:

- 100 commercial ports
- 3 Royal Navy docks
- 150,000 moorings
- 231 Lifeboat stations
- 297 marinas
- 325 commercial fishing fleets

What material is disposed of at sea?

When proposals are made for the disposal of dredged material to sea, an assessment is required of the possible impacts. These assessments are governed by international convention and national legislation. In the UK, material disposed is mainly sand and silt from our harbours, docks, marinas and estuaries. On average, 40-50 million tonnes (25M m³) of sediment is deposited within our designated marine disposal sites each year.

How is dredged material assessed?

The main aim of assessment is to determine the possible impacts of the proposed disposal on:

- human health
- the marine ecosystem
- and another legitimate uses/users of the sea.

Evidence used to assess the proposed disposal includes:

- project method and timing
- material quality and quantity
- type of material
- historical inputs
- environmentally sensitive areas
- economic and social needs
- commercial fisheries and shellfisheries, and
- any implications for other users.



Conceptual model of evidence-based decision making



Decision making is supported by links between monitoring, research, assessment and regulation. A continuous flow of information supports decision makers and is adapted to respond to the current needs of regulators and legislation.

Acknowledgement

Figure 2 is reproduced from Admiralty Chart 1900 by permission of the Controller of Her Majesty's Stationery Office and the UK Hydrographic Office (www.ukho.gov.uk). Not to be used for navigation.

Case study: Rame Head

The Rame Head disposal sites have been used for up to 100 years. The sources of the dredged material are the ports, harbours, berths, and navigation channels in and alongside Plymouth Sound and its estuaries.

Assessment of dredged material proposed for disposal at Rame Head has been undertaken since 1976. The disposal site has been monitored since 2001. A review of the management of the disposal of dredged material at this site was completed in 2005. This review considered:

- physical
- biological
- chemical, and
- socio-economic issues.

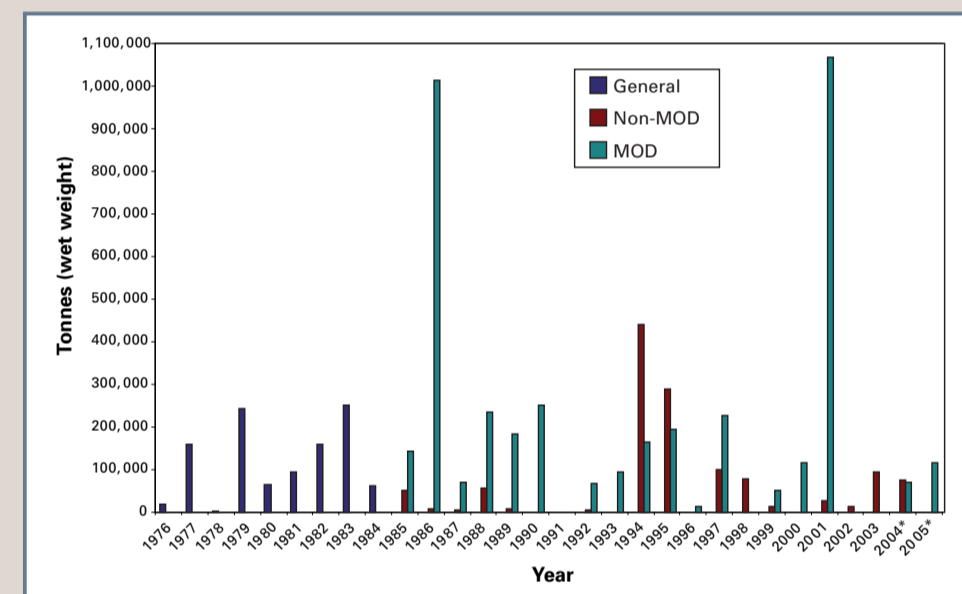


Figure 1: Quantity of material disposed to the Rame Head disposal site, 1976-present (NB – data for 2004 & 2005 are incomplete at present).

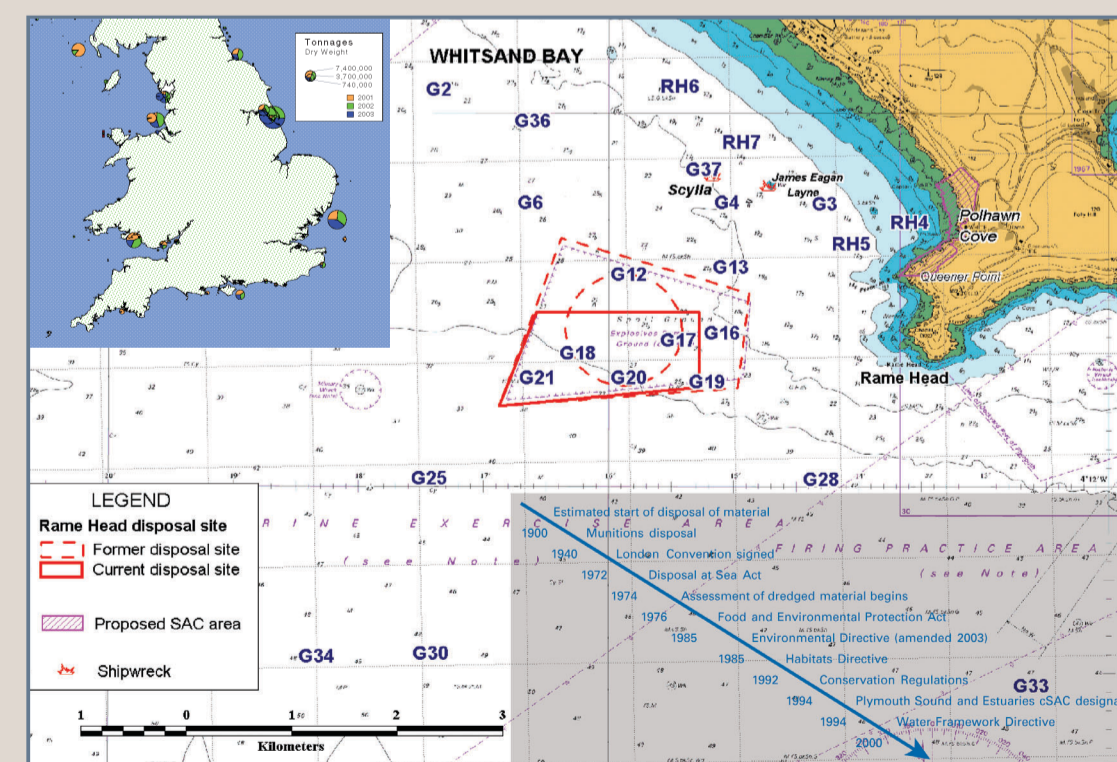


Figure 2: Sites of the past and current dredge material disposal sites and the locations of stations for which CEFAS holds interpreted data from grab samples. Inset (top): Tonnes disposed of at UK disposal sites for 2001-2003 inclusive. Inset (bottom): Use and Regulation Timeline.

Monitoring

There are approximately 150 disposal sites used in England and Wales. Each year a monitoring program selects ~10% of these sites to survey. Disposal sites are chosen on the basis of the following criteria:

- current public concerns
- compliance monitoring
- proposed or actual change in use of the disposal site, and
- analysis of existing time-series data.

Depending on the current issue or concern, samples collected (chemical, biological and physical) can be processed immediately or archived for future analysis. The information is reported back to the regulatory advisers to underpin current and future decision making.



Issues and Evidence

Parameter	Potential impact	Evidence	Conclusion	Recommended future work
Physical				
Siltation increased within the bay	Sea-bed and organisms smothered with silt	Bed samples, hydrodynamic data & models, side-scan sonar & swath surveys	No identified impact	<ul style="list-style-type: none"> • Explore a range of weather conditions, by a longer-term ADCP survey between the disposal site and Whitsand Bay • Survey of the seafloor • Add wind and wave data into the sediment transport model
Turbidity increased	Light reduced in water column, benthic algae impacted	Turbidity record from logger attached to Scylla	No identified impact	<ul style="list-style-type: none"> • Capture high-resolution data on suspended load and turbidity • Deploy an ESM2 logger prior to the next scheduled disposal operation
Biological				
Biology denuded	Reduced numbers of species or functional groups	Monitoring surveys of benthic fauna	No identified impact	Comparison could be made with the literature if appropriate, or if not, with appropriate sites in a nearby similar embayment (e.g. Bigbury Bay)
Bioassay	Mortality of fauna	Bioassays conducted	No identified impact	Collect sediments from site G28 (SSW of Rame Head) for bioassay
Chemical				
PAH pollution	Acute and chronic effects on fauna	Analysis of bed samples	Concentrations elevated	The source of PAHs is not proven, so that testing is required of inputs from the wider catchment
Presence of DDT and organochlorine pesticides (OCP)	Toxic and endocrine-disrupting capabilities	None	No identified impact	Commence analysis of existing samples for DDT and OCPs (collected from licencing samples) to help identify the sources of contamination
Metal concentrations increased		Analysis of bed sediments	Concentrations in the Rame Head area are similar to the regional pattern and most are far lower than for the Tamar Estuary	If required, sediment samples could be analysed for their mineralogy
Socio-economic				
Litter increased	Visual problem	Evidence sparse and little inshore. Mostly limited to disposal site	Impacts unknown	Commission a diver survey in Polhawn Cove to assess litter (by means of established survey techniques) and collect sediments and other material for analysis

Conclusions

- Monitoring and assessment of the disposal site at Rame Head indicates that the environmental effects of deposited dredged material are largely confined to the immediate vicinity of the licensed disposal site.
- Further investigation is required to address certain gaps in existing knowledge. Nevertheless, the weight of evidence supports the view that the continued disposal of dredged material at the Rame Head site is an environmentally acceptable one, subject to appropriate licence conditions and management of the activities.