

12 MONITORING PROPOSALS¹

12.1 EXISTING MONITORING INITIATIVES

12.1.1 Background

1. As part of the consent process for deepening of the approach channel to the Haven Ports in 1998/2000, the HHA developed a 'mitigation and monitoring package' for the scheme (PDE, 1998). This package was accepted by the DETR (now DfT) in October 1998 as part of their consent for the works under the Coast Protection Act 1949. In conjunction with this, MAFF (now DEFRA) issued consents to the HHA for the various sediment placement schemes associated with the package under the Food and Environment Protection Act (FEPA) 1985, which brought with them monitoring conditions.

2. Compliance with the actions set out in the package, the mitigation measures proposed as part of the EIA process, and the conditions of the FEPA consents must be ensured; and this responsibility lies with the HHA². Information collated to date on the various habitat and sediment replacement (mitigation) schemes and monitoring surveys related to the above are reported on an annual basis (and most recently in PDE and HR Wallingford, 2001). The annual report is produced in order to provide feedback to English Nature, the Environment Agency, the DTLR and DEFRA (as well as CEFAS, the RSPB and the Suffolk and Essex Wildlife Trusts) on the results of HHA's monitoring programme, progress against the objectives of mitigation, and a summary of the future management strategy. The report is one of the HHA's management initiatives, in conjunction with annual (initially biannual) Regulators meetings, which all parties listed above attend (see Appendix 1). Furthermore, in recognition of the fact that the mitigation and monitoring programme implemented is intended to be flexible and to evolve, through the agreement of this meeting, the strategy can be modified. The recent proposal to increase the level of sediment replacement through water column recharge is a clear example of this (see Section 6).

3. In addition to the requirements for monitoring associated with the channel deepening, the HHA (in conjunction with the Port of Felixstowe) have adapted and extended the existing programme to provide the required monitoring information for the extension of the Trinity III Terminal. In line with

¹ This section is largely unchanged from that published in the tidal works ES; however, Table 12.1 has been updated to reflect the monitoring that has been progressing since the submission of the tidal works ES

² Posford Haskoning monitor the HHA's compliance with the various mitigation and monitoring actions on them on a quarterly basis and report the outcomes in a Compliance Report biannually

this principle, it is proposed to further extend the ongoing monitoring programme in relation to the proposed tidal works and channel deepening at Bathside Bay.

4. The HHA will act as an agent to the Port of Felixstowe in implementing the actions of both parties with respect to the compensation, mitigation and monitoring arising from the works.

5. The following objectives were developed for the existing mitigation and monitoring package. Proposals for the mitigation of that part of the impact of the tidal works and channel deepening on the estuary system that is mitigatable are outlined in Section 6.

12.1.2 Objectives of the monitoring programme

1. Detailed objectives for monitoring have been defined in order to determine whether or not any impacts on the favourable conservation status of the European site(s) arise as a result of the existing and proposed works, and their associated mitigation schemes. The monitoring objectives can be summarised as:

- i. To increase understanding of the processes operating in the Stour and Orwell estuaries and Hamford Water and to define those aspects that relate to the proposed works;
- ii. To measure the change in habitat distribution and to understand the relationship between morphology, habitat and the populations and distribution of designated bird species;
- iii. To validate and refine the ongoing mitigation actions and those proposed in Section 6;
- iv. To fully monitor the effect and thereby success of mitigation.

12.1.3 Overview of monitoring activities

1. An overview of the ongoing monitoring activities (and their purpose) within the Stour and Orwell estuarine system and Hamford Water is provided in Table 12.1. Further details of the monitoring, and a summary of the findings of the results to date, are provided in the HHA's Annual Report (PHE and HR Wallingford, 2002).

12.2 FUTURE MONITORING STRATEGY

12.2.1 Estuary-wide

1. Table 12.1 provides details of the HHA's existing monitoring programme and indicates (in ***bold italics***) those aspects that are relevant to the Bathside Bay development. It is important to note that the current

monitoring undertaken by the HHA is an ongoing, extensive programme of research. Many of the aspects of the monitoring programme are undertaken on a rolling programme and, therefore, a long-term dataset will be developed over time. The monitoring is to continue for at least 10 years and for as long as necessary to demonstrate that the 1998/2000 channel deepening, and the subsequent maintenance requirement, are not having a net adverse effect on the integrity of the Stour and Orwell Estuaries SPA and Hamford Water SPA.

2. In addition to these measures, the following monitoring initiatives are to be implemented:

- The continued detailed analysis of dredging performance, offshore placement and recycling through analysis and reporting of dredging records. As the dredging regime has been established as a key effect on the estuary regime, the presentation and incorporation of this information into the compliance monitoring regime will be important;
- Recording of dredging activities will continue with annual reporting of volumes of sedimentation (as measured by bathymetric survey), volumes dredged, estimates of mass (dredged and in-situ) and volumes (masses) disturbed. The volumes (and estimates of mass) placed at Inner Gabbard or used in the sediment replacement programme will also be reported; and,
- Monitoring of dissolved oxygen concentrations throughout the water column during maintenance dredging and water column recharge.

3. The HHA are already discussing opportunities for the use of LIDAR and CASI data with the Environment Agency.

12.2.2 Monitoring related to the proposed development

1. In addition to the estuary-wide monitoring recommended above, further targeted monitoring is proposed to measure the local effects of the proposed tidal works and channel deepening at Bathside Bay:

- 5 yearly topographic and vegetation (saltmarsh) surveys of Erwarnton Bay and the Shotley foreshore;
- Targeted bed frame monitoring in the intertidal areas at the eastern end of Erwarnton Bay and at Shotley to evaluate the benefit of water column recharge and to monitor the detail of intertidal processes;
- Monitoring of the clay placement at the Inner Gabbard (East) to identify the initial distribution of clay on the bed after placement and any subsequent movement; and,
- Monitoring of the biological communities at the Inner Gabbard (East).

2. If a decision to undertake direct placement is made in the future, further detailed monitoring would need to be proposed and undertaken. Detailed, site specific monitoring would also be a clear requirement of a

compensation package and would need to be closely tied to the habitat, and SPA sustainability objectives, that the site was required to meet.

12.2.3 Commitment to monitoring

1. A monitoring agreement will be developed for Bathside Bay through which the HHA and HPUK will make a commitment to the monitoring requirements described therein and discussed here.

Table 12.1 Overview of previous and ongoing monitoring activities by the HHA¹

Monitoring activity	Purpose	Action
Bathymetry	To determine the changes in the intertidal and subtidal habitats in relation to erosion or accretion of sediment	<ul style="list-style-type: none"> • <i>Stour and Orwell estuaries and Hamford Water surveyed on a 5 year rolling programme (Stour and Orwell estuaries most recently completed in 2000; Hamford Water due to commence in winter 2002);</i> • <i>Surveys of the offshore area (channel and outer harbour) repeated on a 3 to 5 year return (most recently completed in 2001);</i> • Surveys at the Inner Gabbard from 1998 to 2000 (characterisation for maintenance disposal); post-disposal surveys are also to be undertaken as part of the Trinity III Terminal (Phase 2) Extension
Sedimentation and epifaunal recovery	To record potential sedimentation around the Roughs Tower following concerns raised by local fishermen	<ul style="list-style-type: none"> • Commercial lobster pots monitored for evidence of sediment accumulation (completed in 2000); • Forty modified prawn pots to monitor level of epifaunal recovery around the disposal ground (ongoing)
Sediment transport	To define sediment transport pathways in and around Hamford Water	<ul style="list-style-type: none"> • <i>Ongoing research into sediment transport pathways offshore and in/out of Hamford Water;</i> • <i>Suspended sediment monitoring in the Harbour entrance</i>
Benthic communities	To record any actual impacts resulting from the dredging operation, disposal activities and mitigation measures on the health of the biological communities and to determine any changes in community type that could occur as a result of the above	<ul style="list-style-type: none"> • Monitoring of communities at the Inner Gabbard disposal site (post-disposal); post-disposal surveys are also to be undertaken as part of the Trinity III Terminal (Phase 2) Extension • <i>Biotope mapping in the Stour and Orwell Estuaries on a 5 year rolling programme. This aspect was most recently undertaken in 1997 and is due to be repeated in 2003</i>

¹ This table has been updated

Table 12.1 (continued)

Monitoring activity	Purpose	Actions
Fish, shrimp and plankton	To record any changes in fish, shrimp and plankton population abundance and distribution that could result from impacts related to the sediment replacement mitigation measures	<ul style="list-style-type: none"> Monthly beam trawls (fish and shrimp) and zooplankton trawls at 12 stations throughout the estuarine system June 2000 to 2001; these surveys recommenced in December 2001 on a bi-monthly basis as part of the monitoring requirement for the Trinity III Terminal (Phase 2) Extension. As part of the Bathside Bay development, it is proposed that these surveys would be undertaken during the dredging phase and for 1 year subsequent to completion of the dredging
Substrate depth	To assist in determining the influence of the deepening and sediment replacement initiatives on the 'health' of the intertidal resource	<ul style="list-style-type: none"> A survey of sediment depths and distribution using a probe and gravity corer is underway and was completed in late 2001
Suspended sediment monitoring	To meet the objective of providing sediment budgets that will enable refinement of mitigating/compensating measures, if required. To ensure that turbidity levels stay within acceptable limits following ongoing dredging and sediment reintroduction activities	<ul style="list-style-type: none"> Long-term silt monitoring has been undertaken in the Stour and Orwell estuaries using 6 silt monitors. Commencing Autumn 2001, one monitor was moved to outside the entrance of Harwich Harbour to record sediment movement towards Hamford Water. Another monitor is 'fixed' in the Stour and two others 'rove' in conjunction with sediment replacement. Two monitors were deployed in Hamford Water and its approaches in winter 2002; Targeted intertidal bed frame measurements (undertaken in the Stour in 2001)
Intertidal vegetation and topography	To meet the objective of defining the assemblage of intertidal habitats that provide for the effective geomorphological functioning of the estuaries and to fully monitor the effect and thereby success of mitigation	<ul style="list-style-type: none"> 5 year rolling programme of topographic survey (to provide information on the higher part of the intertidal profile, potentially using EA LIDAR data) and echo-sounding for the Stour and Orwell estuaries CASI flight and ground truthing undertaken for the Stour and Orwell estuaries and Hamford Water; 5 year rolling programme for monitoring of seasonal vegetation

Table 12.1 (continued)

Monitoring activity	Purpose	Actions
Waterfowl distribution and abundance	To observe trends in the distribution and numbers of waterfowl over the low water period throughout the estuarine system	<ul style="list-style-type: none"> • Rolling programme of low water counts, completed for the winters of 1999/2000, 2000/2001, 2001/2002 and 2002/2003 (by SWT) and due to continue in the winter of 2003/2004 and onwards; • Annual analysis of high water count data for key species in the Stour and Orwell estuaries and Hamford Water against regional and national trends (involving the BTO)