Executive summary

The Dee Estuary is located on the north-west British coastline between the Wirral Peninsula in England and north-east Wales. It covers an area of 14,000 ha and is one of the largest estuaries in the UK. Coastal processes are dominated by strong tidal streams and large sediment fluxes affecting the intertidal.

The primary task of this study was to undertake dedicated survey work in order to derive high quality data on existing biotopes and supporting physical attributes. Additional evidence from surface contaminants samples and anthropogenic pressure information was collected to assist with assessment of change against historical evidence for each sub-feature. A parallel high level evaluation was also conducted on the presence of key benthic prey items for designated bird species.

Methods

The sampling design was informed by existing biotope distribution, aerial imagery and local knowledge. The survey was designed and implemented using a stratified transect-based approach with vertical transects identified within three predefined estuary sectors targeting three sedimentary littoral sub-features (intertidal mud and sand flats, intertidal muddy sand and intertidal mud). This approach was a compromise between data quality, available resources and the size of the survey area. Field survey methods incorporated a combination of qualitative Phase I and quantitative WFD-compatible Phase II surveys.

Results

Particle size distribution in the Phase II coring samples indicated the presence of finer fractions and well sorted sediments in the inner Dee Estuary compared to areas further out and the entire outer Dee sector which were dominated by sandy shores.

Sediment contaminants analyses indicated that most analytes were within the limits of the Canadian Interim marine Sediment Quality Guidelines (ISQG) and OSPAR contaminants in sediment guidelines. Only one sample had elevated metal levels. No sample was found to exceed the ISQG Probable Effect Levels (PEL) for any of the reported analytes. Most contaminants were below OSPAR BAC (modelled background) or between BAC and the EAC/ERL (concentrations that are unlikely to give rise to unacceptable biological effects) levels. Some organic PAHs were reported over the OSPAR EAC/ERL and only a single PCB congener analysed exceeded the OSPAR EAC/ERL levels. The Redox Potential Discontinuity (RPD) layer was generally deeper than 10cm, indicating well drained sediments and low organic carbon content. Inner estuary sites at areas with finer sediments had shallow RPDs.

A total of 10 intertidal soft sediment biotopes (EUNIS levels 4 & 5) were identified across the transects surveyed. Eight biotopes were identified to EUNIS level 5 or better (three sub-biotopes were recorded) and two areas were assigned to biotope complexes. In addition, an area of sublittoral muddy sand biotope (SS.SSa.IMuSa.EcorEns) was recorded at the lower edge of transect 11. The main habitats of the Dee Estuary SAC were characterised by littoral sand (LSa, 83.1% cover) followed by littoral mud (LMu, 15.8%). A small proportion of sites that bordered the intertidal exposed area during the large spring tides used for survey were assigned to sublittoral sand (SSa). Dominant biotope complexes were medium-fine (MoSa, 16.0%), fine (FiSa, 28.5%) and muddy sand (MuSa, 37.6%). Sandy mud (MEst, 15.2%) areas and littoral mud (UEst, 0.7%) areas were only recorded in the Heswall sector. Extensive areas of saltmarsh (LS.LMp.Sm) were found in transects 0-4. This biotope complex was composed of mature and pioneer marsh and featured a complex morphology with numerous channels and creeks.

Finally, two additional broad habitat areas were recorded at the top of some transects, mixed coarse sediments and rock substrata; LR.MLR.BF.FspiB variant ([*Fucus spiralis*] on full salinity exposed to moderately exposed upper eulittoral rock) was recorded in the New Brighton sector. LR.FLR.Eph.BLitX (Barnacles and [*Littorina*] spp. on unstable eulittoral mixed substrata) was found on and around areas of artificial substrate in the West Kirby sector.

The number of taxa and number of individuals was greatest along the inner estuary sector transects with an average 10.75 taxa and 662 individuals per station (all 3 replicates combined). Species diversity decreased at the middle estuary and outer estuary sectors by 1.49 and 3.08 species, respectively. On average, total abundance halved at the middle estuary and decreased 15-fold at the outer estuary. The trend is likely to reflect the large amount of *Peringia ulvae* and Nematoda recorded within mud and muddy sand biotopes sampled at inner and middle estuarine sectors.

The only clear evidence of anthropogenic pressures within the EMS sandy shores was the collection of *Ensis* spp. (razor clams) at one transect in the New Brighton to Hoylake sector.

Assessment

The purpose of the assessment was to compare historical evidence and new data obtained in 2015, in an attempt to assess any change in habitat type that may have occurred. Where no baseline was available to make such comparisons, measures were taken to form a baseline and ensure repeatability.

Comparisons with surveys undertaken in 2005 and 2011 suggest that the general distribution of main habitats (sub-features) and biotope complexes across the outer, middle and inner Dee Estuary EMS have not deviated greatly from the established baseline. It was however noted that some new areas of the estuary are now covered by saltmarsh whilst other areas have reverted to muds. These changes may be the result of movements in the main channels and marsh creeks. It is likely that a net gain in saltmarsh coverage has occurred since 2005 and that this process is continuing along the areas of pioneer marsh.

The preliminary assessment considers that the following conservation objectives have been met:

- no significant decrease in the extent of intertidal mudflats and sandflats from an established baseline;
- average black layer depth should not deviate significantly from an established baseline;
- the level of contaminants in sediments should comply with Probable Effects Levels (PEL); and
- spatial distribution of mud biotopes should not deviate significantly from an established baseline.

Due to the difference in survey approaches it is not possible to make a specific recommendation for the following targets:

- average PSA parameters should not deviate significantly from an established baseline;
- no decrease in the variety of muddy sand and mud biotopes from an established baseline; and
- maintain availability of key prey items of preferred prey sizes.

No conservation objective targets were judged to be not met.

Further information

Natural England evidence can be downloaded from our **Access to Evidence Catalogue**. For more information about Natural England and our work see **Gov.UK**. For any queries contact the Natural England Enquiry Service on 0300 060 3900 or e-mail **enquiries@naturalengland.org.uk** .

Report number RP02729

ISBN 978-1-78354-425-7