NPWS

Malahide Estuary SAC (site code: 205)

Conservation objectives supporting document - Marine habitats

Version 1

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Introduction

Malahide Estuary SAC is designated for the marine Annex I qualifying interest of Mudflats and sandflats not covered by sea water at low tide (1140) (Figure 1).

An intertidal survey was undertaken in 2010 (ASU, 2011) and data on the *Zostera* beds were derived from the EPA national Water Framework Directive monitoring programme (http://www.epa.ie/whatwedo/wfd/monitoring/). These data were used to determine the physical and biological nature of this SAC and the overlapping Broadmeadow/Swords Estuary Special Protection Area (SPA) (site code 4025).

Aspects of the biology and ecology of Annex I habitats and Annex II species are provided in Section 1. The corresponding site-specific conservation objectives will facilitate Ireland delivering on its surveillance and reporting obligations under the EU Habitats Directive (92/43/EC).

Ireland also has an obligation to ensure that consent decisions concerning operations/activities planned for Natura 2000 sites are informed by an appropriate assessment where the likelihood of such operations or activities having a significant effect on the site cannot be excluded. Further ancillary information concerning the practical application of the site-specific objectives and targets in the completion of such assessments is provided in Section 2.

Section 1

Principal Benthic Communities

Within Malahide Estuary SAC five community types were recorded in the Annex I habitat and the overlapping SPA. These are presented in table 1 and a description of each community type is given below.

Community Type	SAC Annex I Habitat	SPA
	Mudflats and sandflats not covered by seawater at low tide (1140)	
Fine sand with oligochaetes, amphipods, bivalves and polychaetes community complex	✓	✓
Estuarine sandy mud with Chironomidae and *Hediste diversicolor* community complex	✓	✓
Sand to muddy sand with *Peringia ulvae, Tubificoides benedii* and *Cerastoderma edule* community complex	✓	✓
Zostera-dominated community	✓	✓
Mytilus-dominated community complex	✓	✓

Table 1 The community types recorded in Malahide Estuary SAC and the overlapping SPA.

Estimated areas of each community type in the Annex I habitat, based on interpolation, are given in the objective targets in Section 2.

The development of a community complex target arises when an area possesses similar abiotic features but records a number of biological communities that are not regarded as being sufficiently stable and/or distinct temporally or spatially to become the focus of conservation efforts. In this case, examination of the available data from Malahide Estuary SAC identified a number of biological communities whose species composition overlapped significantly. Such biological communities are grouped together into what experts consider are sufficiently stable units (i.e. a complex) for conservation targets.

FINE SAND WITH OLIGOCHAETES, AMPHIPODS, BIVALVES AND POLYCHAETES COMMUNITY COMPLEX

This community complex occurs along the eastern boundary of the site from the Martello Tower at Balcarrick in the north to Portmarnock in the south (Figure 2).

The sediment of this community complex is largely that of fine sand (ranging from 74% to 88.9%) with negligible amounts of coarse material (<4%).

The complex is distinguished by the oligochaete *Tubificoides benedii,* the crustacean *Bathyporeia guilliamsoniana,* the bivalve *Angulus tenuis* and the polychaetes *Nephtys cirrosa*, *Hediste diversicolor*, *Scoloplos armiger* and *Scolelepis squamata*, all of which occur in moderate abundances here (Table 2).

Distinguishing species of the Fine sand with oligochaetes, amphipods, bivalves and polychaetes community complex	
Tubificoides benedii	*Hediste diversicolor*
Bathyporeia guilliamsoniana	*Scoloplos armiger*
Angulus tenuis	*Scolelepis squamata*
Nephtys cirrosa	

Table 2 Distinguishing species of the Fine sand with oligochaetes, amphipods, bivalves and polychaetes community complex.

ESTUARINE SANDY MUD WITH CHIRONOMIDAE AND *HEDISTE DIVERSICOLOR* COMMUNITY COMPLEX

This complex is recorded at Swords where the Ward River and Broad Meadow River enter the Malahide estuary (Figure 2).

The sediment is largely that of sandy mud with silt-clay and very fine sand accounting for between 19.6% to 59.7% and 12.4% to 28.4% of the sediment fractions respectively. The remaining fractions range from 0.8% to 12.5% coarse sand, very coarse sand from 0.4% to 5.1%, medium sand from 1.6% to 27.7% and the fine sand fraction from 8.7% to 21.9%. The proportion of gravel recorded is negligible (<1%).

The fauna is distinguished by unidentified Chironomidae species and the polychaete *Hediste diversicolor* which occur in high to moderate abundances here. The oligochaetes *Heterochaeta costata* and *Paranais litoralis* are also recorded here (Table 3).

Distinguishing species of the Estuarine sandy mud with Chironomidae and *Hediste diversicolor* community complex	
Chironomidae	*Heterochaeta costata*
Hediste diversicolor	*Paranais litoralis*

Table 3 Distinguishing species of the Estuarine sandy mud with Chironomidae and *Hediste diversicolor* community complex.

SAND TO MUDDY SAND WITH *PERINGIA ULVAE*, *TUBIFICOIDES BENEDII* AND *CERASTODERMA EDULE* COMMUNITY COMPLEX

This community complex is recorded extensively within the estuary from Donabate to Malahide (Figure 2).

The substrate here is composed largely of fine material with silt-clay ranging from 2.2% to 59.7%, very fine sand from 3.2% to 32.9% and fine sand from 6.1% to 80%. Coarse material accounts for less than 7% of the sediment fractions.

The fauna is distinguished by the gastropod *Peringia ulvae*, the oligochaete *Tubificoides benedii* and the bivalve *Cerastoderma edule* which all occur in moderate abundances within this complex. The polychaete *Hediste diversicolor* and the bivalve *Scrobicularia plana* are not uniformly distributed, having their highest abundances near Malahide Point. The polychaetes *Scoloplos armiger, Pygospio elegans* and *Nephtys hombergii* are also recorded here (Table 4).

Distinguishing species of the Sand to muddy sand with *Peringia ulvae, Tubificoides benedii* and *Cerastoderma edule* community complex	
Peringia ulvae	*Scrobicularia plana*
Tubificoides benedii	*Scoloplos armiger*
Cerastoderma edule	*Pygospio elegans*
Hediste diversicolor	*Nephtys hombergii*

Table 4 Distinguishing species of the Sand to muddy sand with *Peringia ulvae, Tubificoides benedii* and *Cerastoderma edule* community complex.

ZOSTERA-DOMINATED COMMUNITY

The intertidal seagrass *Zostera noltii* is recorded in two discrete areas to the north of the site, on Burrow Strand at Corballis and along the shore to the east of Kilcrea (Figure 2).

The sediment here is largely that of fine sand which accounts for 80% of the sediment fractions. Coarse material and fines fractions are negligible.

The coverage of *Zostera noltii* at this site ranges from 60% in the more westerly bed to 82% in the beds on Burrow Strand. The fauna is dominated by the gastropod *Peringia ulvae* which is recorded in very high abundances; the polychaetes *Pygospio elegans* and *Scoloplos armiger* occur in high abundance here. The infauna is similar to that recorded for the "Sand to muddy sand with *Peringia ulvae*, *Tubificoides benedii* and *Cerastoderma edule* community complex" (See Table 4).

MYTILUS-DOMINATED COMMUNITY COMPLEX

This community occurs on the intertidal expanse between the railway line and the spit at Malahide Point (Figure 2).

The bivalve *Mytilus edulis*, with algal epibionts such as *Ectocarpus* sp. are abundant here. Between the clumps of mussel patches of sandy mud occur in which the polychaete *Arenicola marina* is recorded in densities of between 3-4m^{-2}. The bivalve *Scrobicularia plana*, barnacles and encrusting polychaetes also occur within this complex (Table 5).

Distinguishing species of the *Mytilus*-dominated community complex	
Mytilus edulis	*Fucus vesiculosus*
Ectocarpus sp.	*Enteromorpha* sp.
Arenicola marina	*Ulva intestinalis*
Littorina littorea	*Scrobicularia plana*

Table 5 Distinguishing species of the *Mytilus*-dominated community complex.

Section 2

Appropriate Assessment Notes

Many operations/activities of a particular nature and/or size require the preparation of an environmental impact statement of the likely effects of their planned development. While smaller operations/activities (i.e. sub threshold developments) are not required to prepare such statements, an appropriate assessment and Natura Impact Statement is required to inform the decision-making process in or adjacent to Natura 2000 sites. The purpose of such an assessment is to record in a transparent and reasoned manner the likely effects on a Natura 2000 site of a proposed development. General guidance on the completion of such assessments has been prepared and is available at www.npws.ie.

Annex I Habitats

It is worth considering at the outset that in relation to Annex I habitat structure and function, the extent and quality of all habitats varies considerably in space and time and marine habitats are particularly prone to such variation. Habitats which are varying naturally, i.e. biotic and/or abiotic variables are changing within an envelope of natural variation, must be considered to have favourable conservation condition. Anthropogenic disturbance may be considered significant when it causes a change in biotic and/or abiotic variables in excess of what could reasonably be envisaged under natural processes. The capacity of the habitat to recover from this change is obviously an important consideration (i.e. habitat resilience) thereafter.

This Department has adopted a prioritized approach to conservation of structure and function in marine Annex I habitats.

1. Those communities that are key contributors to overall biodiversity at a site by virtue of their structure and/or function (keystone communities) and their low resilience should be afforded the highest degree of protection and any significant anthropogenic disturbance should be avoided.
2. In relation to the remaining constituent communities that are structurally important (e.g. broad sedimentary communities) within an Annex I marine habitat, there are two considerations.
    2.1. Significant anthropogenic disturbance may occur with such intensity and/or frequency as to effectively represent a continuous or ongoing source of disturbance over time and space (e.g. effluent discharge within a given area). Drawing from the principle outlined in the European Commission's Article 17 reporting framework that disturbance of greater than 25% of the area of an Annex I habitat represents unfavourable conservation status, this Department takes the view that licensing of activities likely to cause continuous disturbance of each community type should not exceed an approximate area of 15%. Thereafter, an increasingly cautious approach

is advocated. Prior to any further licensing of this category of activities, an inter-Departmental management review (considering *inter alia* robustness of available scientific knowledge, future site requirements, etc) of the site is recommended.

2.2. Some activities may cause significant disturbance but may not necessarily represent a continuous or ongoing source of disturbance over time and space. This may arise for intermittent or episodic activities for which the receiving environment would have some resilience and may be expected to recover within a reasonable timeframe relative to the six-year reporting cycle (as required under Article 17 of the Directive). This Department is satisfied that such activities could be assessed in a context-specific manner giving due consideration to the proposed nature and scale of activities during the reporting cycle and the particular resilience of the receiving habitat in combination with other activities within the designated site.

The following technical clarification is provided in relation to specific conservation objectives and targets for Annex I habitats to facilitate the appropriate assessment process:

Objective **To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Malahide Estuary SAC, which is defined by the following list of attributes and targets.**

Target 1	The permanent habitat area is stable or increasing, subject to natural processes.

- This target refers to activities or operations that propose to permanently remove habitat from a site, thereby reducing the permanent amount of habitat area. It does not refer to long or short term disturbance of the biology of a site.
- Early consultation or scoping with the Department in advance of formal application is advisable for such proposals.

Target 2	Maintain the extent of the *Zostera*-dominated community and *Mytilus*-dominated community complex, subject to natural processes.

- The *Zostera*-dominated community and *Mytilus*-dominated community complex are considered to be keystone communities that are of considerable importance to the overall ecology and biodiversity of a habitat by virtue of its physical complexity, e.g. the former community serves as important nursery grounds for commercial and non-commercial species while both provide important food sources for a number of bird species.
- Any significant anthropogenic disturbance to the extent of this community should be avoided.

- An interpolation of the likely distribution of these community types are provided in figure 2. The areas given below are based on spatial interpolation and therefore should be considered indicative:
    - *Zostera*-dominated community – 5ha
    - *Mytilus*-dominated community complex- 4ha

Target 3	Conserve the high quality of the *Zostera*-dominated community, subject to natural processes.

- It is important to ensure the quality as well as the extent of *Zostera*-dominated communities is conserved. For example, percent coverage can provide an indication of the habitat quality as well as giving information on the habitat complexity and refuge capability; all important components in maintaining the structural and functional integrity of the habitat.

Target 4	Conserve the high quality of the *Mytilus edulis*-dominated community complex, subject to natural processes.

- Every effort should be made to avoid any death to living *Mytilus edulis*.
- Any significant anthropogenic disturbance to the quality (e.g. living individual/m^2) of the community should be avoided.

Target 5	Conserve the following community types in a natural condition: Fine sand with oligochaetes, amphipods, bivalves and polychaetes community complex; Estuarine sandy mud with Chironomidae and *Hediste diversicolor* community complex; and Sand to muddy sand with *Peringia ulvae, Tubificoides benedii* and *Cerastoderma edule* community complex.

- A semi-quantitative description of the communities has been provided in Section 1.
- An interpolation of their likely distribution is provided in figure 2.
- The estimated areas of the communities within the Mudflats and sandflats not covered by seawater at low tide habitat given below are based on spatial interpolation and therefore should be considered indicative:
    - Fine sand with oligochaetes, amphipods, bivalves and polychaetes community complex – 126ha
    - Estuarine sandy mud with Chironomidae and *Hediste diversicolor* community complex – 7ha
    - Sand to muddy sand with *Peringia ulvae, Tubificoides benedii* and *Cerastoderma edule* community complex – 169ha
- Significant continuous or ongoing disturbance of communities should not exceed an approximate area of 15% of the interpolated area of each community type, at which point an inter-Departmental management review is recommended prior to further licensing of such activities.

- Proposed activities or operations that cause significant disturbance to communities but may not necessarily represent a continuous or ongoing source of disturbance over time and space may be assessed in a context-specific manner giving due consideration to the proposed nature and scale of activities during the reporting cycle and the particular resilience of the receiving habitat in combination with other activities within the designated site.

Bibliography:

ASU (2011). A survey of mudflats and sandflats in Ireland. An intertidal soft sediment survey of Malahide Estuary. Produced by ASU on behalf of the Marine Institute in partnership with National Parks & Wildlife Service.

EPA http://www.epa.ie/whatwedo/wfd/monitoring/ and http://www.epa.ie/downloads/pubs/water/waterqua/name,31043,en.html

Figure 1. Extent of Mudflats and sandflats not covered by seawater at low tide in Malahide Estuary SAC

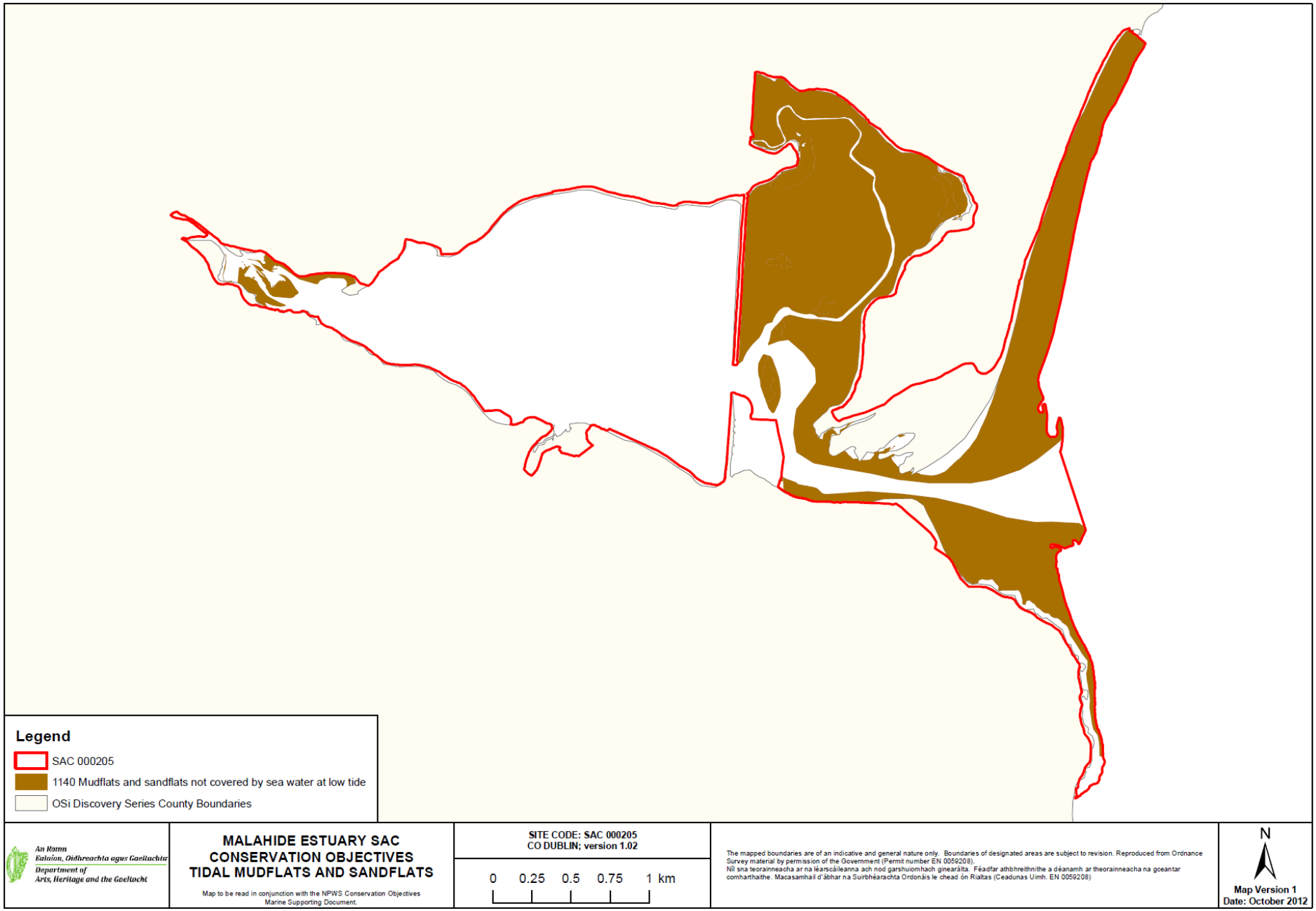

Figure 2. Distribution of community types in Malahide Estuary SAC