

## Morecambe Phase VI Coastal Defence Development Mitigation works – Technical Note 3

### 1. Post habitat creation monitoring (15<sup>th</sup> August Site Visit)

This technical note has been prepared to keep Natural England (formerly English Nature) and Lancaster City Council informed about the physical and ecological development of the Morecambe Phase VI mitigation work. This mitigation work was completed on 5<sup>th</sup> May (see Technical Note 2 dated 11 May 2006) and this note presents the results of a site visit that was carried out on 15<sup>th</sup> August 2006 (just over 3 months after the completion of the work) to assess how the new habitat was developing. During this visit the general habitat development of the mitigation area was reviewed and the specific characteristics of the substratum and epifauna were examined at the 6 sample sites that were set up on 5<sup>th</sup> May. The key findings from this visit, with reference back to the May survey, were as follows: -

- (1) **Extent of mitigation area:** - The extent/boundary of the mitigation area which had been mapped on 5<sup>th</sup> May 2006 was again surveyed by the contractor (Birse CL) on 15<sup>th</sup> August. These boundaries are shown on Figure 1 and are contiguous which indicates that the created habitat has been stable over this initial period and has not measurably changed. As discussed previously, the total area of skear created is 11,900m<sup>2</sup>. This is less than the original objective because there was a lower amount of fertile skear material available (see Technical Note 1) and because the depth of the newly created skear was slightly greater than the depth of the original excavations (see Technical Note 2). However, it is expected that this greater depth of the created habitat will help to enhance the feature's stability (see next point).
- (2) **Elevations across skear habitat:** - In May Birse CL also made baseline elevation readings on an approximately 10-metre grid across the skear feature (Figure 1). At that time the elevation across the skear was relatively consistent and ranged between only 1.9 to 2.5mCD (i.e.  $\pm 60$ cm). In August, preliminary elevation readings were taken at each of the 6 quadrat locations. The elevation differences between the two surveys are believed to be minimal (in the region of  $\pm 5$ cm) and therefore the feature appears to be vertically as well and spatially stable (this will be confirmed by detailed readings in future surveys).
- (3) **Physical appearance of area:** - Across the mitigation site there is a spatial change in the sediment composition from north to south. This was evident in May and still apparent in August. The northern third of the area was dominated by a cobble and pebble substratum while the southern two thirds were a mixture of exposed clay and fine sand, with less frequently occurring pebble and cobble covering the remainder of the area. The increasing proportion of clay in this southern area occurred as the cobble resource from the source skear became exhausted. The seaward edges of the skear habitat were also mainly clay dominated and it is possible that this will act as a shield to the erosive action of the sea. The heterogeneous composition and relatively uneven topography of the skear has enabled a variety of niche habitats to be available for the benthic community. This should maximise species abundance and diversity. Also, the proportion of lying water over the entire skear habitat was approximately 30%.

Achieving a good proportion of lying water was a key design objective and this is expected to be highly beneficial in terms of enhancing flora and fauna abundance and diversity.

- (4) **Fixed-point photographs:** - Photographs were taken at each of the 6 quadrat locations and compared to the baseline conditions in May (see photos 1 to 6 at the end of this note). All the sites were physically very similar between the May and August surveys. From the photos it is apparent that even some of the small cobbles are in identical positions. Further photographs of the habitat were taken in August at each of the 16 locations that were previously set (apart from those locations which were now inaccessible due to the construction) both at beach level and from elevated vantage points on the bank behind the promenade. Photo positions 2 and 7 were inaccessible and the latter was replaced with a panoramic view of the skewer area taken from the top of the breakwater (see Figure 1 for location). These, and previous photographs taken at the same locations, have been collated on an interactive website (<http://www.abpmer.net/morecambe>).
- (5) **Ecological development of mitigation habitat:** - During the site visit in August the ecological development of the skewer site as a whole and at the 6 specific quadrat locations was assessed. In general terms it was evident that a small proportion of the visible epifaunal organisms had survived the translocation. For instance occasional adult periwinkles were present (although in lower numbers than the richer parts of the original skewer). In the northern area of the mitigation habitat (Sites 1 to 3), rough periwinkles (*Littorina saxatilis*) were dominant and between 30-120 individuals were found at each quadrat site. Juveniles of this species were also occasionally found under the rocks. Given the small size (2-3mm) of these juveniles it is expected that they were this year's offspring. The rough periwinkle bears live offspring (i.e. the females retain the fertilised eggs in their body and release smaller 'copies' of the adults). Other species with a planktonic life phase may take longer to establish themselves here. For instance Mussels (*Mytilus edulis*) and the edible periwinkle (*Littorina littorea*) were occasionally present in the northern sites but were very rare and were only the adults that had survived the relocation. It is expected that the planktonic larvae of these species will migrate to this area over the next year or so. In particular, it is hoped that the southern (clay-dominated) area of the habitat will be suitable for mussel bed development while the northern cobble-dominated area will be ideal for periwinkles. Juvenile barnacles (*Elminius modestus*) were present throughout the quadrat samples. Barnacles also have a larval planktonic stage and their numbers are expected to increase greatly over the next few years. The algae (*Enteromorpha*) had also settled across some of the habitat and covered approximately 10% of the area at many of the quadrat sites. This coverage may be attributed to the decrease in grazing pressure from epifaunal species. Hence, until the abundance of epifauna increases to a point where they can be a serious predatory threat, this opportunistic alga is likely to continue to exploit the area especially during the warmer months. Other species were present in low numbers, particularly in the northern to middle area of the skewer (Sites 1 to 4), including snails (*Hydrobia ulvae*) and juvenile crabs (*Carcinus maenas*). Small numbers of the following species were also found at the skewer habitat (some outside the quadrat sites): limpets (*Patella* sp.), amphipods (*Gammarid* sp.), polychaetes (*Nephtys* sp.) as well as juvenile chiton and anemone species (like

the juvenile rough periwinkle these latter two species are expected to have settled after the translocation).

In general terms, the southern end of the skear habitat (sites 4 to 6) had a poorer epifaunal community given that there were less under-boulder or under-cobble niche areas, which are valuable for epibenthic species. However, given that there were some rocks embedded in the clay at site 5 and 6, and the fact that they are at the margin of the main skear habitat, this southern area of the mitigation habitat, which is less suitable for grazers, has the potential to develop into a mussel bed in future years.

- (6) **Next stage:** - ABPmer will revisit the skear habitat later in the year to carry out another habitat survey of the area. Bird surveys will also be carried out to mid-winter to describe the value of the area for birds. A fourth technical note and website update will be issued after the next visit.

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Table 1: Photographs and field data from the May and August 2006 surveys













Site No.	5 <sup>th</sup> May 2006	15 <sup>th</sup> August 2006	Algae and Epifauna (abundance or % cover)	Substrata (% cover)
1			<i>Enteromorpha</i> (20) Mussels (1 ind, 1.5cm) <i>Elminius modestus</i> (1-2%) <i>Littorina saxatilis</i> (~30 ind, incl year 1 juv.) <i>Hydrobia ulvae</i> (P)	Small boulders (<1) Cobbles (30) Pebbles (35) Gravel (35)
2			<i>Enteromorpha</i> (10) <i>Elminius modestus</i> (2%) <i>Littorina littorea</i> (P) <i>Littorina saxatilis</i> (120 ind) Juv. <i>Carcinus maenas</i> (P) Gammarid sp. (P)	Small boulders (10) Cobbles (20) Pebbles (35) Gravel (35)
3			<i>Enteromorpha</i> (20) <i>Mytilus Edulis</i> (2 ind, 10mm); <i>Elminius modestus</i> (2%) <i>Littorina saxatilis</i> (50-100 ind, 50% year 1 juv.) <i>Nephtys</i> sp. (P), Chiton (P)	Small boulders (5) Cobbles (30) Pebbles (40) Gravel (20) Sand (5)
4			<i>Enteromorpha</i> (5) <i>Elminius modestus</i> (P) Juv. <i>Carcinus maenas</i> (P) Juv. Anemone (2 ind)	Cobbles (5) Pebbles (40) Gravel (35) Sand (20)
5			<i>Enteromorpha</i> (5) <i>Elminius modestus</i> (P)	Cobbles (25) Pebbles (30) Gravel (10) Sand (5) Clay (30)
6			<i>Enteromorpha</i> (2) <i>Elminius modestus</i> (P) <i>Littorina saxatilis</i> (2 ind)	Cobbles (5) Pebbles (40) Sand (40) Clay (15)



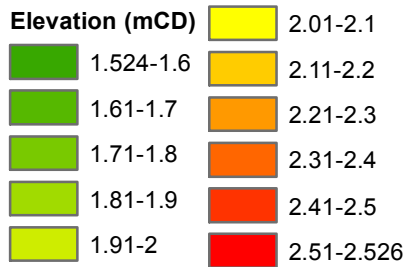
Figure shows baseline elevations as measured in May 2006. Additional elevations at each quadrat site were taken in August 2006.



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Projection: OSGB 1936

Location: R:\Projects  
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Elev\_Aug06.mxd



- Quadrat Sampling Points
- Mitigation 05/05/06
- Mitigation 15/08/06
- New Photo location 7

