

## 3.9 Subtidal Soft Sediments

Generally what is considered “marine” relative to “coastal” is separated at the 30m depth contour.<sup>1</sup> Marine habitats extend from the midshelf and beyond into the abyss. Contiguous from estuaries to the coast, in- and offshore to the KZN shelf edge at 20 m is a habitat that is always covered by water (subtidal) and characterised by soft sediment at the bottom.

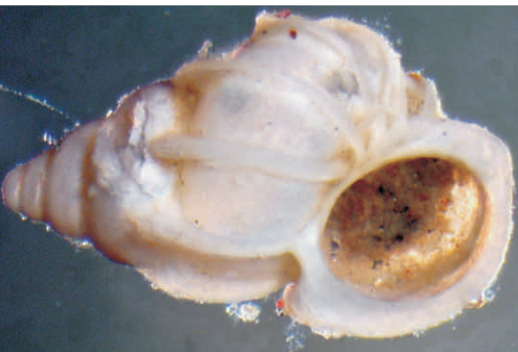
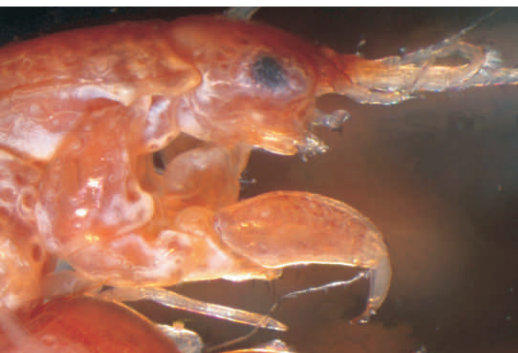
Coastal and marine sediments, ranging from large gravel elements to fine muds, occupy over 70% of the seafloor and constitute one of the largest habitats on earth.<sup>2;3</sup> This is a three

dimensional habitat, due in part to its relatively unconsolidated nature as opposed to rocky and coral reef counterparts, where biota are confined to hard, impermeable substrates.<sup>4;5</sup>

### Distribution and nature of soft sediments

In KZN the most significant subtidal soft sediment habitat is found on the continental shelf between Richards Bay and Durban. This uncharacteristically wide shelf section, known as the Natal Bight, has been identified as being highly productive due

Types of animals found in or on the KZN seafloor.



Photos: Fiona MacKay

to the influence of local oceanographic features as well as out-welling via the Thukela, one of the largest rivers in the country.<sup>6; 7</sup>

The African Coelacanth Ecosystem Programme (ACEP) has supported research into this poorly studied area with preliminary findings showing a wealth of marine invertebrate species, particularly around Durban and Thukela, some of which may be new to science.<sup>8</sup>

## Influences on ecology

Although the seafloor is considered to be one habitat type, an assortment of micro-habitats can be discerned because the physical nature of the seabed is defined by geological origin, sediment type, topography, depth, light, temperature and effects of wave and tide energy.<sup>9</sup> The nature of the sediment is also determined by some coastal determinants such as estuarine and river outflow bringing in new sediment types and nutrients.<sup>10; 11; 12</sup> These combined characteristics influence the type of bottom life that can occupy this vast seascape.

## Ecology of soft sediments

While most of the shelf area lies below the photic zone (where light can penetrate), the soft sediment environments support high species diversity. Small macrobenthic invertebrates (<1mm) that live in the sediments are a dominant component as they are secondary producers.<sup>10; 11; 13; 14; 15; 16</sup> They also have functional roles crucial to many important ecosystem processes such as promoting decomposition, nutrient recycling and transferring energy to other food web components.<sup>10; 14; 15; 16; 17</sup> In KZN on the inner shelf of the central Natal Bight (10-50 m), this ecosystem supports the only commercial, multispecies crustacean bottom trawl fishery in the country,<sup>18; 19; 20</sup> the main targets being white, brown and tiger prawn.

## Habitat threats

Bottom trawling is a fishing method where large bag-shaped nets are pulled along the seafloor, dragging and digging into soft sediments resulting in habitat destruction. Bottom-dwelling fauna can take up to five years or more to recover from this activity<sup>21</sup> resulting in areas that never get a chance

to return to their natural state. Trawl fishing is non-targeted and thus many other types of bottom-associated marine life are swept up,<sup>22</sup> although efforts are being made to reduce this collateral effect on the KZN shelf.<sup>23</sup>

Close to the coast, pollution effects (*Section 9.3*) can alter subtidal soft sediment ecology through land derived nutrients causing eutrophication and even anoxia in shallow waters. The longest seabed ecology studies have happened in localised areas of interest on the Natal Bight, namely Durban and Richards Bay where the cities' effluents are being discharged to the sea through offshore pipeline systems.<sup>24</sup> Sewage effects on the seabed appears to increase productivity of animals there, but with time only hardy, tolerant species remain in sediments that become anaerobic.

**Soft sediments are the dominant benthic marine habitat found worldwide. Many different organisms live there and many provide valuable economic services (e.g. fisheries). The properties of the seabed, including the sediments, have strong effects on the distribution and abundance of species, as do the impacts from humans. ■**

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