Suggested citation of this Section: Janine Adams 2014. Aquatic Plants. Ugu Lwethu – Our Coast. A profile of coastal KwaZulu-Natal. KwaZulu-Natal Department of Agriculture and Environmental Affairs and the Oceanographic Research Institute, Cedara, 55-57.

4.1 Aquatic Plants

Aquatic plants living within the coastal environment range from species that occupy the water column such as microalgae (e.g. phytoplankton) and floating or submerged plants (e.g. seagrasses), to those that inhabit the intertidal and supratidal regions, such as emergent macrophytes (e.g. salt marsh, reeds, sedges and mangroves). The area extending from the intertidal reaches of the seashore to the subtidal reefs is home to a fourth group of coastal marine vegetation, seaweeds. Each of the different habitat types are characterised by specific species or groups of species, based on their tolerance to salinity and inundation. Aquatic vegetation is largely associated with estuaries (see *Section 3.3*).

Microalgae

Phytoplankton and microphytobenthos (collectively called microalgae) contribute significantly to the primary productivity of estuaries. They play an important role in nutrient cycling, and the microphytobenthos stabilise sediments. Microalgal production, however, is sporadic and short-lived within estuaries during open mouth conditions, as the outflow from estuaries washes plankton and/or benthos from the system to the open ocean. During closed conditions however, microalgal production increases as sediment disturbance, turbidity and current speed is reduced, thereby increasing water clarity. Estuaries in KZN are characterised by high sediment loads and consequently high turbidity, as detailed in *Section 3.3*, which limits phytoplankton and microphytobenthos production in these systems.

Submerged macrophytes

Submerged macrophytes are rooted in the substrate with their leaves in the water column. These plants are important primary producers that help to oxygenate the water column,

Floating and emergent vegetation in the freshwater reaches of a coastal lake.

Photo: Fiona MacKay

stabilise sediments and act as nursery areas for juvenile fish and other organisms. Submerged macrophytes generally include Cape eelgrass, oval saltweed and sago pondweed.[1]

These plants have specific tolerances to salinity. Seagrasses are closely associated with seawater, while pondweed prefers less saline conditions. Common seagrass species specific to the KZN coastline include stalked seagrass and the narrowleaf seagrass.[1]

Submerged macrophytes are not well represented in KZN, as they cannot withstand silt deposition and are sensitive to light reduction, which reduces photosynthesis and primary production. Sediment suspension due to flooding causes temporary smothering of these plants (dredging can have the same effect). These plants are also sensitive to low water levels, exposure and desiccation. For example, Cape eelgrass has not been reported in the St Lucia Estuary since 2005 as a result of fluctuating water level and high salinity.

Emergent macrophytes

Salt marshes

Salt marshes consist of a few halophytic species that occur in specific zones along an elevation gradient from lower intertidal to supratidal. Species composition within these zones is determined by inundation period, salinity ranges and depth of groundwater. Species tolerant of inundation occur at the lower tidal levels and those less tolerant at the higher elevations. Salt tolerant grasses such as bakgras, bahia grass, buffalo grass and couch grass are common in KZN. However, salt marshes only occur in estuaries whose intertidal conditions are conducive to their growth, such as the Mhlathuze and Umlalazi, and are then associated with mangroves.

Reeds, sedges and rushes

Reeds, sedges and rushes are emergent macrophytes found along the banks of water bodies. They ensure bank stabilisation, protection against erosion and provide refuge for fauna. In saline estuaries the presence of reeds and sedges indicate brackish conditions or freshwater input. However, due to the high rainfall in KZN, this habitat merges with the freshwater wetlands, which are discussed in *Section 3.6*. Most reed and sedge species are of economic value; they can be used for building material, such as the dune slack sharp rush, which is used in craftworks. Dominant species found in KZN include the swamp-reed, bulrush, alkali bulrush and dune slack sharp rush.

Siltation from mismanagement of the catchment areas has resulted in a reduction in water depth and reed encroachment in a number of small KZN estuaries, such as Siyaya Estuary. Increased nutrient input has resulted in increased growth of rafting grasses and reeds.

Swamp forest

Swamp forests are forested wetlands subjected to high watertable levels, high soil saturation and periodic or continuous flooding in freshwater conditions. They play an important role in the attenuation of floods, erosion control and detritus input. Dominant tree species are the waterbessie, powderpuff tree and hippo fig. Lagoon swamp forest occurs in many of KZN's estuaries, where it occurs as isolated patches in the upper reaches of permanently open estuaries or is dominant in the smaller, fresher, temporarily open estuaries such as Mdloti.[2] In permanently open estuaries they can also occur at sites where freshwater seeps from adjacent coastal dunes. Much of the area of swamp forest has been lost to development, agriculture and forestry.

Mangroves

Mangroves only occur on the eastern coastline of South Africa, from East London (Nahoon Estuary) to the Mozambique border (Kosi Bay)[3; 4] between the mean sea level and mean highwater springtide level. Mangroves, which are detailed in *Section 3.5,* have the unique adaptation of having pheumatophores (aerial roots) that allow these plants to survive in soils that are poorly drained, saline, anoxic and rich in organic matter.

Seaweeds

Seaweeds are large marine algae that grow, almost exclusively, in shallow waters of the world's oceans and provide shelter and food for a range of species.[5] Seaweeds can be broadly separated into three divisions: Chlorophyta (green algae), Phaeophyta (brown algae) and Rhodaphyta (red algae).[1] South African seaweed flora is rich on a global scale.[6]

Green algae

Green algae are easily distinguished by their bright green colour, which is brought about by the pigments chlorophyll *a* and *b*.[1] In the upper reaches of KZN tidal pools, one is likely to find antenna weed and sea lettuce. In the mid-tidal zone commonly occurring green algae include golf-ball codiums and Lucas' codium. In the lower intertidal zone wedge weed, upright codium and false codium are likely inhabitants. Strap caulerpa is commonly seen in large, shiny patches in pools

and in the sandy gullies of the lower intertidal zone, while flat-lobed codium are commonly seen in the deeper pools at low tide.[1; 7]

Brown algae

Brown algae is made up of a combination of pigments, mainly green chlorophyll *a* and *c* together with a number of other pigments such as brown fucoxanthin, resulting in a yellowish brown colour.[1] Commonly seen in intertidal rock pools of KZN are the smooth-tongue dictyopteris and the different-leaved sargassum. Within the mid-intertidal pools, blue dictyota can be found, while the lower reaches of intertidal rock pools are home to spotted dictyota and *Zonaria subarticulata*. Species such as *Chnoospora minimaare* are found in the exposed tidal pools of the KZN north coast.[1; 7]

Red algae

The majority of seaweeds are red algae, containing blue and red pigments and green chlorophyll *a*.[1] Commonly occurring in the lower intertidal and shallow sub-tidal areas of KZN are the common galaxaura, flat galaxaura, the knobby seaweed and the lace weed. Abbott's jelly-weed, rosy curled hypnea and the untidy spyridia are all commonly seen in the mid-intertidal pools. In the lower tidal pools stalked roseweed, nodular coralline algae and hinged corallines are commonly found.[1; 7]

Spatial distribution of aquatic vegetation

Besides St Lucia, the area covered by macrophyte habitats is generally small throughout the KZN region, due to dense coastal forest and riparian vegetation, as well as high urbanisation, industrialisation and land degradation. St Lucia Estuary has extensive areas of intertidal succulent salt marsh (approximately 500 ha) and saline grass lawns (approximately 1700 ha), while smaller areas of salt marshes occur at Mhlathuze (60 ha), Richards Bay (52 ha) and Mlalazi (39 ha).

Input from municipal wastewater treatment works (WWTWs) can result in eutrophication and high phytoplankton and microphytobenthos biomass, as is found, for example, in the Mhlanga and Mdloti estuaries.[8; 9] Eutrophic conditions have encouraged the spread of reeds in the lower reaches of the Mhlanga, Msimbazi and uMahlongwane estuaries,[10] allowing them to become invasive. Emergent species thrive under these conditions and invasive aquatic macrophytes such as water hyacinth and water cabbage out-compete indigenous plants.

Threats to aquatic vegetation

Unfortunately, the KZN coastal region has been extensively developed and impacted by sugarcane farming and commercial forestry, which has resulted in loss of natural habitat, particularly in the floodplain and riparian zones. Sand winning, infilling, reclamation, bridge and causeway construction has all resulted in loss of habitat. Catchment degradation has resulted in sedimentation, shallowing and changes in downstream aquatic habitats.

The Brazilian pepper tree and lantana have invaded disturbed floodplain areas and riparian zones. In many areas, aquatic habitats have been drained in order to cultivate the floodplain. Overall, this has resulted in woodier vegetation, encroachment by terrestrial vegetation and a loss of aquatic habitat. Reduction in freshwater inflow to estuaries and an increase in the frequency and duration of closed mouth conditions is also a threat.

In South Africa, mangroves and certain seagrass species are unique to the KZN coastline. The large estuaries in northern KZN are important nationally, because of their unique contribution to biodiversity. The largest mangrove forests in the country occur here and extensive salt marsh habitat is also present.

From a socio-economic perspective, macrophyte habitats provide much-needed bank-stabilisation and coastal protection against large sea-swell and storm events. Reeds and sedges are harvested by local communities for building material and household products. There is a need to manage these ecosystems in a sustainable manner to ensure that the ecosystem services are maintained. ■