

# NUTRIENT RECYCLING IN THE SEASONAL PANS

Seasonal pans and associated terrestrial habitats comprise the eastern half of Intaka Island (8 ha). The western half comprises constructed wetlands and associated terrestrial habitats.

The pans are seasonal because they fill up with water in the rainy season (winter) and dry out in the dry season (summer). There is no specific point of inflow into the pans - they receive water only from direct rain and some drainage from adjacent higher ground. Water does not flow out of the pans but is lost mainly through evaporation and some seepage into the ground.

The pans are salty because water and dissolved salts do not flow out, and the pans are seldom flushed by floods. Dissolved salts that flow into the pans therefore accumulate, making the pan substrate (the soil on the floor of the pans) very salty. When the pans fill up, the water also becomes salty by dissolving these salt deposits.

Salt marshes used to be fairly common on the Cape Flats, but are now very rare. Intaka Island is one of very few places on the Cape Flats where salt marshes still exist.

In winter the pans look like this. Many waterbirds use the pans at this time of year.

In summer they look like this. The reddish colour of the pans is caused by a small plant called *Sarcocornia perennis* that grows over the pan floor wherever conditions are very salty and no other plants are able to grow.

Here we see two halophytes (salt-loving plants), *Sarcocornia perennis* and *S. natalensis*. *S. perennis* is far more common at Intaka Island. It grows in summer when the pans are dry. The plants have a reddish tint that gives the pans their characteristic colour. The bright maroon plant, *S. natalensis*, is ecologically similar but much less common. Both plants die off and decompose in winter when the pans fill with water.

Break off a piece of *Sarcocornia perennis* and note the jointed, leafless stems and their succulent structure for storing moisture. Taste it and note the saltiness

When the pans are full, they provide ideal conditions for fast-growing water weeds and algae. The shallow water allows enough light to penetrate to the floor of the pan where many of the weeds are rooted. (The plants in the bottom righthand corner of the picture are *Sarcocornia perennis* that are dying off.) Aquatic plant life provides food for herbivorous birds such as the Redknobbed Coot and various ducks.

In spring, when conditions become warmer, a particular alga, *Cladophora*, becomes dominant and forms dense mats that float on the surface. *Cladophora* and other weeds are manually removed from the canals to avoid an accumulation of rotting vegetation.

As the pans dry out, the water plants die off and form a mat of dead material on the floor of the pan. This mat supports the growth of bacteria and other decomposer organisms.

The dead plant material provides a rich source of food for decomposer organisms to feed on. However, conditions are too salty for most species. Surprisingly, a type of earthworm flourishes here (despite its moist, permeable skin) and one can see innumerable castes on the surface where the worms have burrowed through the substrate and taken food from the surface mat of dead plant material

The activity of the earthworms breaks down the dead plant material. It also loosens the soil and distributes nutrients so that they enter and enrich the soil. These nutrients support the growth of *Sarcocornia*

The plant (and bacterial) nutrients also help to build the bodies of the worms (primary consumers), who then become a source of nutrients for predators (secondary consumers).

Another secondary consumer is the Cape Golden Mole. The mole feeds on invertebrate prey, including earthworms. Here we see from their sub-surface burrows that moles have ventured out of their normal terrestrial habitat onto the pan floor to prey on earthworms. Examples of tertiary consumers would be the top predators that eat moles and birds, such as Mole Snakes and birds of prey, like the Peregrine Falcon.

In winter when the pans fill with water again, the nutrients released by the decomposition of the previous season's plants, and by rotting *Sarcocornia*, are available for a new season of growth.

