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Right here all around you, the energy from the sun, oxygen and carbon from the air, nitrogen and phosphorus from the mud, and seawater combine to give life - mangroves. Each hectare of mangroves drops up to eighteen tonnes of dead leaves and twigs each year. This mangrove litterfall is the most important single component in the estuarine food web.

Bacteria and fungi play an essential ecological role in decomposing dead organic matter. Bacteria are by far the most numerous type of life on the intertidal flats at Osprey House. Basic ecological processes of estuaries depend on the bacteria and the ecosystem would collapse rapidly without them. The process of decay can take many months and can occur on the mud, in the mud and in the water. The estuarine ecosystem is distinctive in that the main path of energy through the food web is through the decaying mangrove litter.

During the decay process, many creatures live on the decaying matter which is a cocktail of bacteria, fungi and vegetable matter. Zooplankton, prawns and mullet as well as filter feeders such as worms, oysters and other bivalves depend on this food.

At low tide, the surface of the mud is alive. Small crabs, birds, burrowing fish and molluscs are abundant. Mud whelks and some small crabs consume the mats of diatoms and cyanobacteria found near the high tide mark.

All of the animals that consume the decaying vegetable matter may be consumed by larger fish and birds. Prawns, mullet and oysters provide food for people as well.

Over summer, migratory wading birds feed on these mud flats building up their store of energy to undertake the long flight to the temperate zone of the Northern Hemisphere. The Bar-Tailed Godwit is a common visitor here and feeds mainly on the plentiful supply of small crabs.

On any day, recreational and commercial fishing boats can be seen from here. Most seafood caught in Moreton Bay depends on mangroves. Prawns, mud crabs, bream and mullet are commonly caught in the Pine Rivers estuary. Loss of the mangroves will rapidly lead to the destruction of the estuarine ecosystem and consequently the loss of multi-million dollar fishing industries.

The Web of Life

Trace the threads of the web as they weave life together. See how one thing depends on another - sun, earth, water, air plants and animals, including us.

In the estuarine ecosystem, there is a cycle of matter between mud and living things. Very generally, living things take on one of three roles: producer, consumer or decomposer. Producers grow and reproduce using solar energy and inorganic substances (nutrients) contained in the mangrove mud and in the water. The life forms in this category include mangroves, photosynthesising bacteria, algae, seagrasses and phytoplankton. Consumers are life forms that feed on other life forms, plant or animal as either grazers, hunters or scavengers. Life forms in this category generally include worms, crustaceans, molluscs, birds, fish and people. Decomposers are the life forms that decay the dead organic matter, eventually forming inorganic substances (nutrients). Life forms in this category are generally microscopic and include bacteria and fungi.

Mangrove mud is formed from fine sediments carried by the river from its catchment. In one litre of this mangrove mud live over a million bacteria, thousands of simple worms, hundreds of segmented worms, dozens of bivalves, probably a crab

and possibly a small fish. The mud also contains a lot of decaying organic matter and fungi. Crabs, as well as other mud dwelling creatures, take vegetable matter and oxygen into the upper layers of mud.

Many of the animals that rely on estuarine ecosystems only live there for part of their lives. Migratory birds are annual visitors, while for many fish and prawns, estuaries are spawning and nursery places. Thus not all matter that is produced in estuaries is recycled there.

In today's estuarine ecosystem, human and other organic wastes are major ingredients as a result of the discharge of sewage and stormwater. All of this surplus organic load cannot be assimilated by the decomposer organisms and shifts the balance of essential ecological processes. The result is excessive growth of phytoplankton, cyanobacteria, such as *Lyngbya* and algae which threatens biodiversity, reduces productivity of seafood and causes public health and amenity issues.