



An ecosystem can be defined as an identifiable system of interdependent relationships between living organisms and their biophysical environment.

Ecosystems are subject to a variety of negative human aspects which ultimately affect the nature and rate of change of the ecosystem. Two such ecosystems which are subject to negative human impacts ~~which~~^{which} affect the nature and rate of change, and are hence at risk, are the Wanda Sandhills in Bate Bay NSW, and the Bicentennial Park Wetlands in Homebush Bay NSW.



The Wanda Sandhills are located two kilometres north of north Cronulla in the central section of the Bate Bay embayed coastline. The dunes boast an area of over 3.8 km^2 , and are subject to a variety of human impacts, most negative in nature which affect the nature and rate of change of the ecosystem at risk.

These impacts include:

- Sand mining and extraction which has resulted in a loss of sand and vegetation cover over the dunes.
- Trampling on the dunes which has seen the dune vegetation destroyed, and sand removed.



- The use of dune buggies in the first kilometre of the Dunes in the North extending from Boat harbour which has seen vegetation removed, and slumping in the incipient foredune.
- The introduction of the vegetative invader, the Bitou Bush, which was originally used to kill the weeds in the incipient foredune area, but has spread uncontrollably and hence killed off native vegetation in all zones of the dune system.

The nature and rate of change in the Wanda sandhills is relatively quick, as the incipient foredune



is quickly eroded during periods of storm wave action, providing the coast with a natural barrier against wind and wave attack, ~~and then~~ The incipient foredune is reformed during periods of low tidal action, as the sand deposited in the offshore bar is returned to the incipient foredune through aeolian transport.

The negative human impacts increase the nature and rate of change in the Wanda Sandhills. The loss of vegetation ~~means~~^{means} the sand is unbound in the foredune areas, and is easily eroded due to wave action increasing the speed of any processes



including the nature and rate of change in the dunes. The scale of any changes is increased with the loss of vegetation cover. Also the removal of sand from the dune system means what sand remains is easily eroded.

The Bicentennial Park wetlands in Homebush Bay, NSW, is located 12 km west of the Sydney CBD on the banks of the Paramatta River and Powells Creek. The intertidal wetlands are flats which develop behind salty water and are subject to twice daily inundation by the sea.

The Homebush Bay wetlands are subject to many negative human impacts which affect the nature and rate of change of the wetlands including:

- Increased development denser on the banks of the Parramatta River
- Infilling of the wetlands for commercial use and farming
- Increased recreational use of the wetlands by humans resulting in vegetation loss and erosion and species destruction.
- Various industries operating on the banks of the Parramatta River e.g. battery factory, paint factory which dump toxic chemicals and by products into the rivers which

feed into the wetlands.

These negative human impacts within the Homebush Bay Intertidal wetlands affect the nature and rate of change of the ecosystem.

The presence of rubbish and infilling of the wetlands reduces the speed of flow of water through the wetland ecosystem.

Salt water is unable to flush through when inundation occurs.

Many of the mangrove species in the wetlands use pneumatophores to obtain oxygen. Large variations in tidal flows have the ability to impact on the working of

pneumatophores and hence kill the mangrove species. The presence of bund walls in the ecosystem slows down the rate of change in the wetlands. Tidal volumes are not able to flush quickly and the rate of change is decreased. Overall the wetlands have a fast rate of change with tidal levels changing frequently throughout the day. These flows are impeded by negative human impacts which disrupt the natural nature and rate of change.

The Homebush Bay wetlands and Wundah Sandhills are two prime examples of ecosystems which are at risk from negative human impacts which affect the nature and rate of change.