



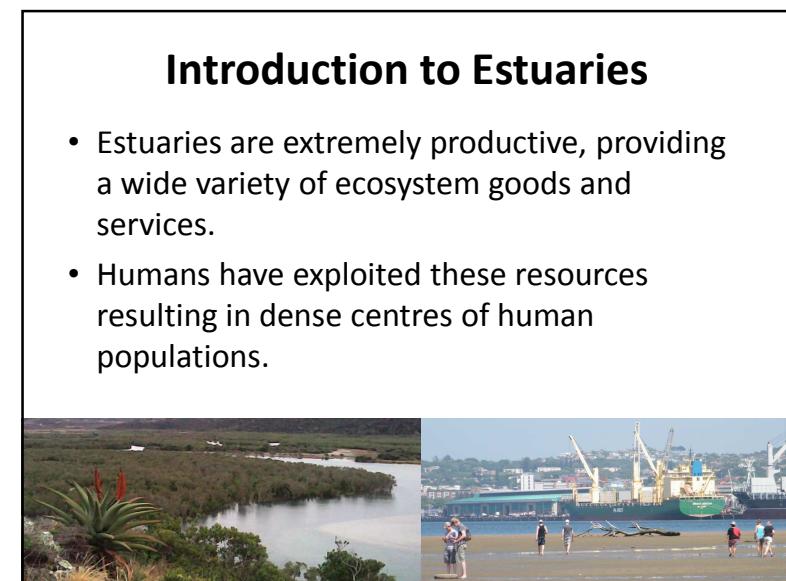
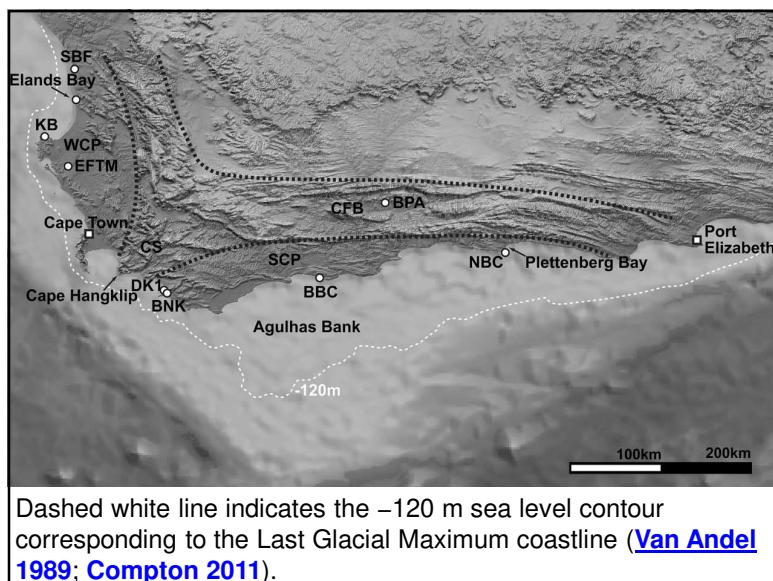
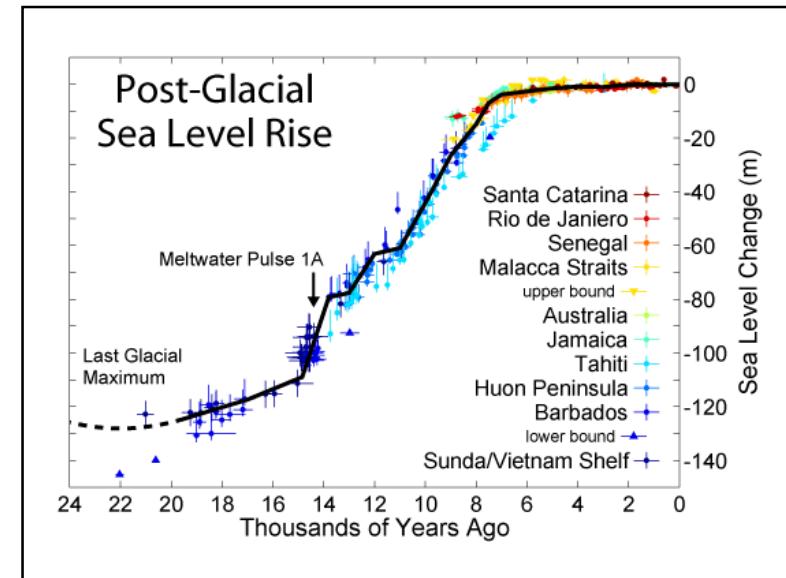
Introduction to Estuaries

- Broadly defined as the area of the earth's coastal zone where there is interaction between ocean water, fresh water, land and the atmosphere.
- Ocean water (35 g salt per litre) is more dense than fresh water (<0.5 g/L).
- Aerial imagery show large plumes of brown, sediment-laden water out to sea.



Introduction to Estuaries

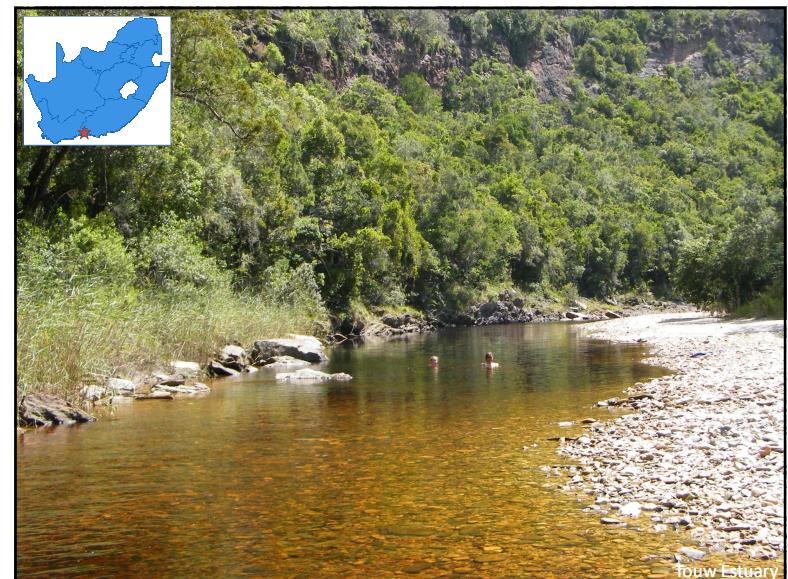
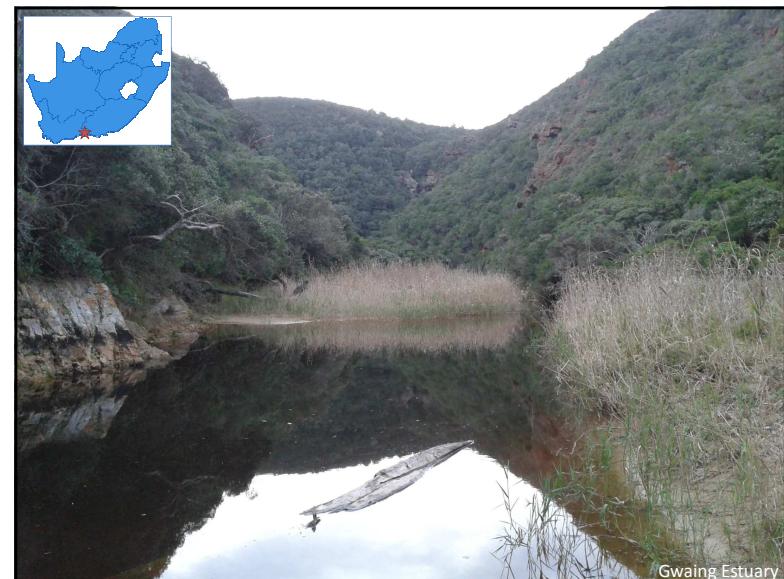
- The Holocene Epoch (past 11,700 years) is referred to as the “age of the estuary”.
- All present day estuaries are <5000 years old due to sea level rise since the last ice age.
- Many estuaries are flooded valleys or coastal plains.

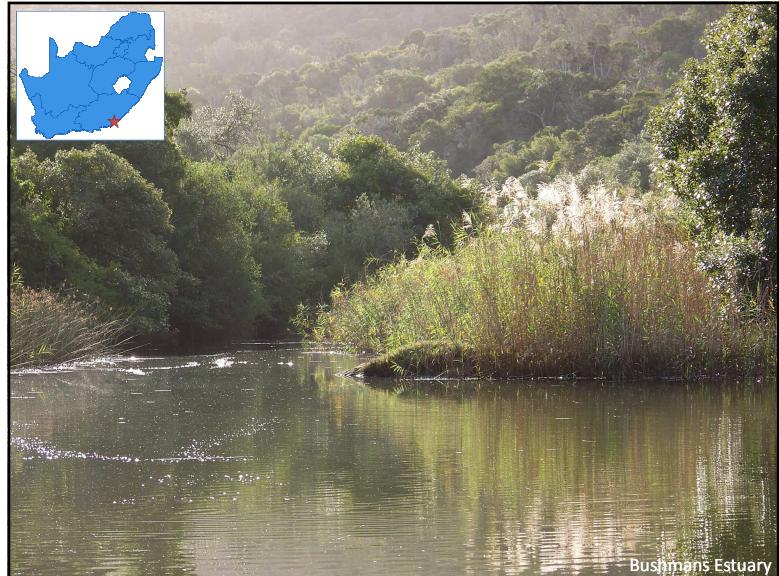




Introduction to Estuaries

- Upper reaches tend to be narrow, the channel rocky or sandy and dominated by submerged and emergent vegetation.
- River water is typically muddy if flow is high or clear during low flows.
- Water is near-fresh and tidal variation is small.





Introduction to Estuaries

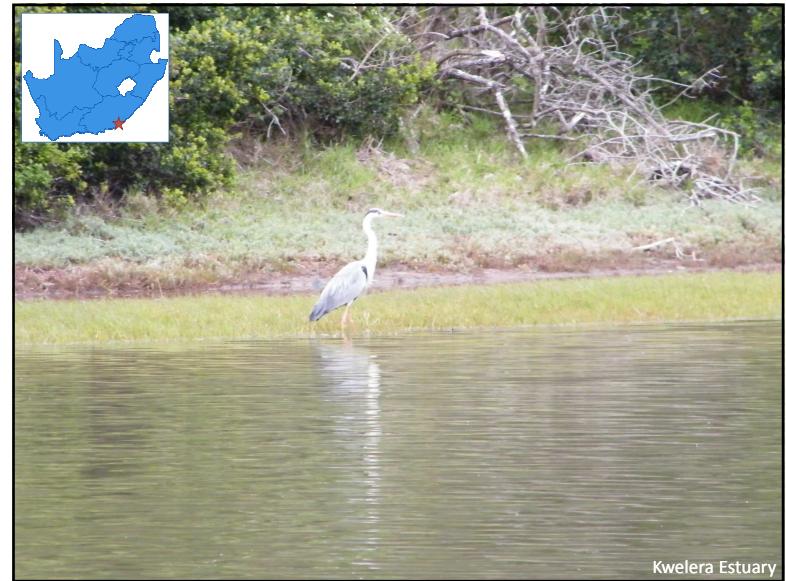
- Moving seawards, tidal fluctuation increases and intertidal zone becomes more extensive.
- The mixing of seawater and river water and tidal currents create a maximum turbidity zone (or river-estuary interface; REI); the most productive area of an estuary.
- Intertidal zones are dominated by extensive saltmarshes and/or mangrove forests (sub-tropics in RSA).

Introduction to Estuaries

- Sediment is typically soft; high clay, silt and organic matter content; nutrient-rich.
- Diversity of plants and animals in this zone; benthic microalgal biofilms, phytoplankton, invertebrates (snails, worms, crustaceans, etc.), fish and birds.
- Banks in middle to lower reaches usually lined with houses and jetties supporting recreational activities and tourism.



Great Brak Estuary



Kwelera Estuary



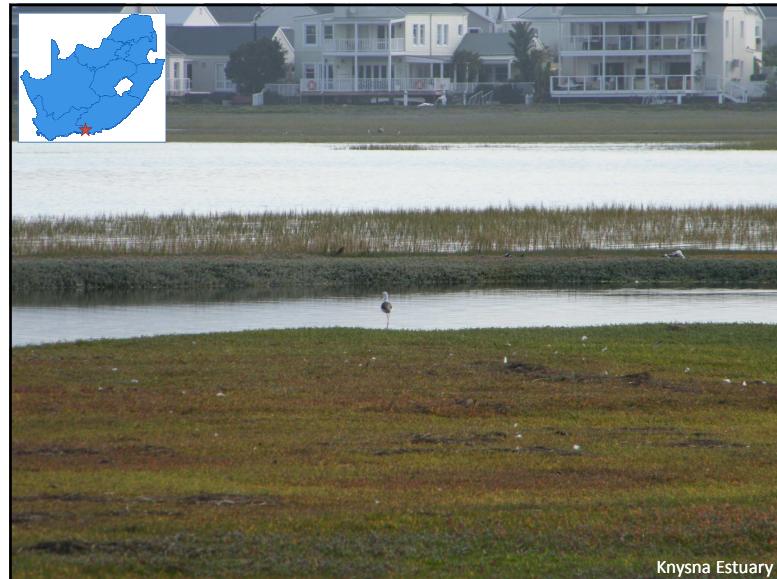
Kwelera Estuary



Great Brak Estuary



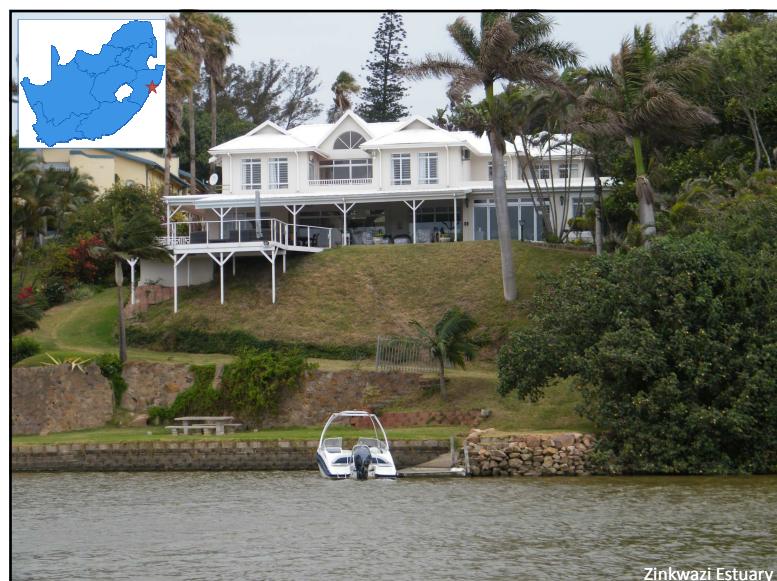
Sundays Estuary



Knysna Estuary



uMngazana Estuary



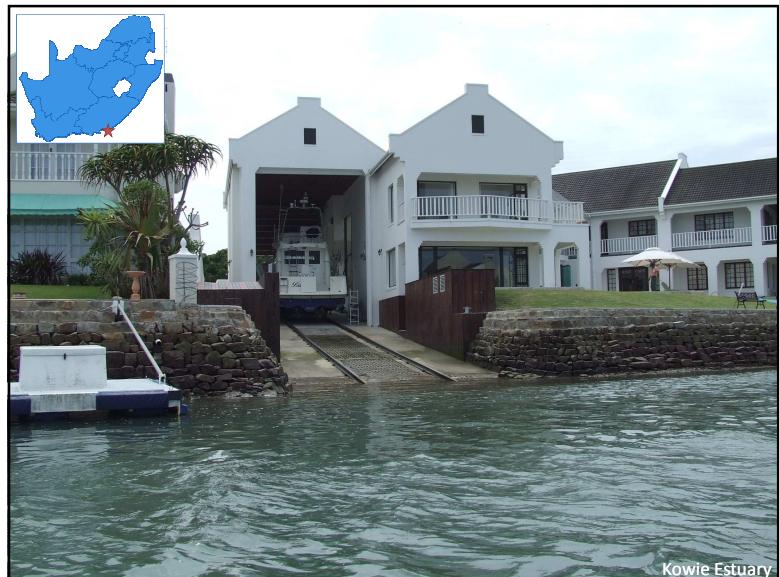
Zinkwazi Estuary



Kowie Estuary

Introduction to Estuaries

- Lower reaches - mouth area - strongly marine influenced.
- Flooding tide pushes in clear sea water and coarse marine sand.
- Estuaries that close to the sea form lagoons.
- Area surrounded by extensive salt marsh or mangroves and most sought after property for tourism.
- Large estuaries used as deep water ports.



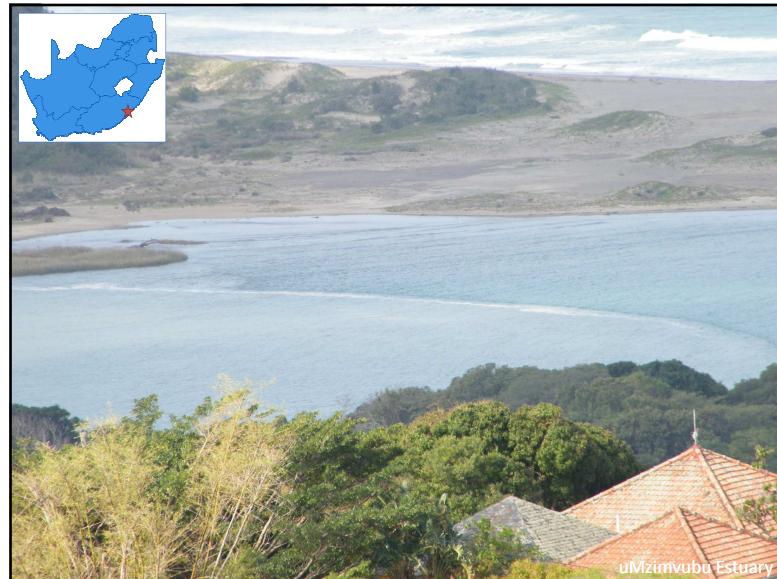
Kowie Estuary



Berg Estuary



Berg Estuary



uMzimvubu Estuary



Great Brak Estuary



Bushmans Estuary