How to use the Estuary Tool

- To obtain the volume of water moving it is necessary to also measure the cross-section area of the estuary. If it is possible, measure the channel width and depth at regular intervals to be able to calculate a cross sectional area.

Once you have the speed of flow and a cross-sectional area, then the volume of water flowing can be calculated

- **Measurement and mapping of salinity and temperature:** Use a DIY hydrometer made out of a drinking straw, a small piece of graph paper, some Prestick and some glue. This will not give a highly accurate reading of salinity - but it is adequate for us to do comparisons that show if water from one site is more salty than that from another site.

- **Observing mouth and beach dynamics:** Sketch the mouth and add annotations to the sketch to understand how the mouth functions. Plan to do this activity at low tide when most of the mouth features are exposed**.**

- **Learning about estuarine plants,animals and their habitats:** The first step is to be able to identify the plant and animal species. In the field take a photo of each species of plant and animal - and if necessary give it a temporary name or code. Once you have some species names, start a checklist of all the species of the estuary. This is something that may take many visits before it is comprehensive. Look at habitats and what plants and animals live in them. The most common habitats are: mangroves, salt marsh, submerged water plants, emergent water plants, swamp forest.

- **Consolidation;reviewing the day spent at the estuary:**

look at the Google Earth image of the estuary. See where you have been - and to add more detail to your map of the estuary from what you have learnt. As you work through your data, there are a number of features of estuaries you need to be aware of, and to discuss.

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STEP 1: SITE OVERVIEW

(A) Before going in field to apply the estuary tool, decide what activities you will be assessing.

What activities to do depends on accessibility to different regions of the estuary, for example - whether the mouth is open or closed, the size of the estuary, availability of transport etc.

STEP 2: IDENTIFYING IMPACTS

(B) Make your own map of the estuary you will be assessing. This will give you an idea of where the estuary is located and give you an idea of the other components of the estuary like the estuary basin, estuary floodplain, river-estuary interface and the mouth.

You can use Google Earth to give you an idea of where the estuary is located. Or you can use a paper map, preferably the Government 1:50 000 topo-cadastral map.

You will take this map in field with you to use.

STEP 3: OBSERVATION OF ACTIVITIES IN THE ESTUARY

- **Observing tidal patterns:** the purpose of this activity is to estimate how large the tidal range is in different places within the estuary. - Place 2 m long measuring sticks in position at intervals from the mouth to the river-estuary interface. Mark the localities on your map (and record the coordinates by taking a waypoint if you have a GPS). Measure the water levels once every few hours.

- **Measuring water flows:** First measure off a length of shoreline of 5, 10 or 20 m (20 m where there are fast flows and 5 m for slow flows). Measure this with a tape measure and mark at each end with a stick or a rock. Then throw a floating object (a stick, a ball or an orange will do) into the middle of the estuary opposite the marker on the bank.
- Time how long it takes to be carried by the water flow to be opposite the downstream marker. Use a cell phone stopwatch to time this. Repeat this several times so that an average rate of movement can be obtained.