What's so good about Mudflats?

What exactly are mudflats?

Mudflats are described as "*sedimentary intertidal habitats created by deposition in low energy coastal environments particularly estuaries and other sheltered areas*".

This is a bit of a dry description, so what it really means is the area between high and low tide, in places where the land is made up mostly of silts and clays with a very high organic content.

Mudflats are intimately linked by physical processes to other coastal habitats such as soft cliffs and saltmarshes.

They commonly appear in the natural sequence of habitats between subtidal channels and vegetated saltmarshes. In large estuaries they can be as large as several kilometres wide and they commonly form the largest part of the intertidal area of estuaries.

What's so good about mudflats?

Mudflats are highly productive areas which, together with other intertidal habitats, support large numbers of birds and fish.

In Edinburgh they provide feeding and resting areas for internationally important populations of migrant and wintering waterfowl, and are also important nursery areas for flatfish.

Mudflats, like other intertidal areas, dissipate wave energy, reducing the risk of eroding saltmarshes, damaging coastal defences and flooding low-lying land.

The mud surface also plays an important role in nutrient chemistry. In areas receiving pollution, organic sediments help separate contaminants and they may contain high concentrations of heavy metals.

Where can I find them?

There are extensive areas of mudflats along the Edinburgh shoreline at **Drum Sands** and **Cramond** which are part of the European designated Special Protection Area particularly for their importance to wading birds.

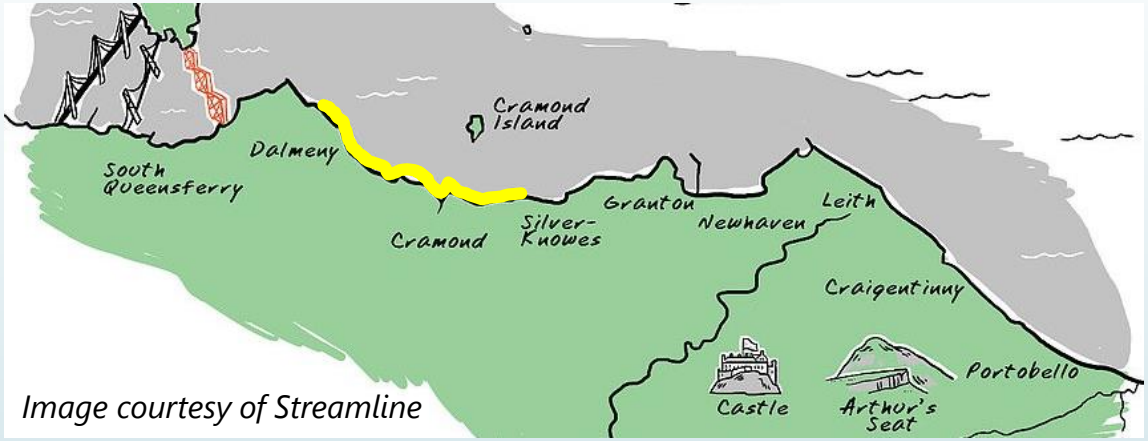

Image courtesy of Streamline

In many places they have been much reduced by land reclamation. In Edinburgh much of the coastal habitat has been lost due to development where over

70% of the city's shoreline is artificial and residual strips of coastal habitats are squeezed between flood defences and rising tides with no space to colonise inland in response to sea level rise.

A study of the inner estuary west of Queensferry showed that 50% of it's saltmarsh has historically been lost to agriculture, industry and harbour development.

What lives in them?

Mudflats are highly productivity biological systems with an abundance of organisms, but low diversity and with few rare species. Typical species associated with mudflats include common cockle *Cerastoderma edule*, sand-hopper *Corophium volutator*, laver spire shell *Hydrobia ulvae*, ragworm *Hediste diversicolor* and annelid worms. With a slight increase in the proportion of sand, the polychaetes - catworm *Nephtys hombergi* and lugworm *Arenicola marina* occur.

We found plenty of species at Cramond during an investigation with Heriot Watt University.

What did we find at Cramond?

Baltic clam

Macoma baltica

Baltic clams live below the surface burrowing in the intertidal mudflats and feed by sucking in food particles with their very long, stretchy siphons.

Shore crab

Carcinus maenas

Male crabs look out for a female just before she is due to moult and then carry her around for a few days until she moults when he get his chance to mate. The female lays her eggs and attaches them to her walking legs carrying them around for several months until they hatch into tiny larvae.

Thin tellin

Tellina tenuis

The thin tellin burrows in clean sand drawing in water and food through one siphon and expelling water through the other. Young flatfish sometimes nip off the protruding siphons which these molluscs are actually able to regenerate.

Brown shrimp

Crangon crangon

Brown shrimps feed on the estuary bottom at night and stay buried in the sand during the day with only their antennae protruding to escape predatory birds and fish.

What did we find at Cramond?

Mud shrimp

Corophium volutator

The embryos of this species develop in a brood pouch, at the front of the body, where the female directly lays her eggs, and where the babies emerge as tiny replicas of their parents. They then construct their own burrow off the parental home burrow.

Lugworm

Arenicola marina

Lugworms live buried in sandy mud feeding on organic material such as micro-organisms and detritus present in the sediment. They can live in densities of 100 – 150 per square metre. They ingest sediment while in their burrows, leaving a depression on the surface sand. When the sediment is stripped of its useful organic content it is expelled out the other end producing a characteristic worm cast.

Edible cockle

Cerastoderma edule

Common or edible cockles are one of the most abundant molluscs in intertidal mud flats and are a major source of food for crustaceans, fish, and wading birds – particularly oystercatchers.

What about algae & seaweed?

In slightly coarser areas, seagrass *(Zostera* spp) beds may develop and despite the history of industrial pollution in the Forth *Zostera* beds are still present.

Where stones and shells provide an initial attachment for byssus threads, beds of the common mussel *Mytilus edulis* occur and accrete material through faecal deposition.

Occasional stones or shells may also provide suitable attachment for stands of fucoid macroalgae such as *Fucus vesiculosus* or *F. spiralis*.

The surface of the sediment is often apparently devoid of vegetation, although mats of benthic microalgae (diatoms and euglenoids) are common. These produce mucilage (mucopolysaccharides) that binds the sediment. Under nutrient-rich conditions, there may also be mats of the macroalgae *Enteromorpha* spp. or *Ulva* spp.

If you want to read more about mudflats and their value for nature and people take a look at RSPB Jim Densham's report:

"Glorious mud homes for nature, protection for people"
http://ww2.rspb.org.uk/Images/glorious-mud_tcm9-415616.pdf


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