

# Estuary

1. An estuary is an area where a watercourse meets the water surface into which it flows, generally at the point where the river reaches the sea (or possibly a lake). Traditionally, all the forms of transition between watercourse and sea have been called 'mouths'; two types are distinguished among them: the delta and the estuary (making up one of the typical pairs found in school vocabulary: river/tributary, plain/plateau, etc.). The term delta is used when the accumulation of alluvium predominates, leaving a broad, low alluvial plain with a river, ramified into branches, flowing across it, often punctuated by lakes and lagoons. When the river course remains clearly perceptible, however, even in places where the valley becomes broader and the influence of the tides can be observed, the term estuary is generally used. But in addition to the fact that when the natural features are analysed, the distinction is not always clear (there are undersea deltas at the bottom of estuaries, estuaries with several branches, others that are bordered by maritime marshes, etc.), opposing the two forms ignores the essential reality: the place of contact between a river course (and hence a valley) and a space of open water, lake, sea or ocean, may represent a situation of transshipment, where there is a concentration of activities.

2. The estuary is a primary type of synapse, between land and sea, and as such, is a natural location for a harbour. Strictly speaking, in the past, and still today, the natural constraints in estuaries have been more favourable to boat traffic than those in deltas, which explains how the notion of the place of contact between an inland space drained by a river valley and a maritime space of exchange makes preferential use of this term. This represents a shift from a definition according to the natural environment (a non-delta type of mouth) to a meaning belonging mainly to the economic and social field. Indeed an estuary, with the help of the tide, allows sea boats, to penetrate, sometimes quite far, into the land. Landward ends of the estuaries of watercourses that move through dense hinterlands are classical locations for harbours (London, Buenos Aires, Rostov, Hamburg, etc.). If one carries this broadening of the meaning further, any mouth becomes an estuary: Rotterdam, which is on a false delta (in the sense of a natural environment, like the environments of the Ganges or of the Pearl River), but is at the opening of a true major economic valley, and even Fos-Marseille, which cannot be conceived otherwise than at the end of the Rhone valley, would then belong to the spatial category of the estuary. The estuary space is generally marked by a downstream movement of harbour developments. The presence of a considerable population linked to those activities also generates other uses of the estuary banks or the immediate coastline (seaside resorts). It is easy to model the recurrence of such uses of estuary space. The general estuary chorotype (R. Brunet) is coordinated with more regional formalisations (M. Brocard).

In a world where maritime exchanges are becoming more and more important, where broad valleys represent increasingly congested axes, where peri-urban coastlines are more and more contested, it should come as no surprise that some of the largest cities in the World (Shanghai, Rangoon, Calcutta, London, New York, etc.) are located at the mouths of rivers.

3. Because of their very recent character (Flandrian transgression) and the interpenetration of marine and hydro-continental features, estuaries represent unstable, rich and vulnerable natural environments. Management of these complex environments is made all the more necessary and difficult by the fact that they represent preferred sites for major economic activities. Tensions between the pressures presented by the economic importance of a location and the natural particularities of the site may produce significant conflicts over uses. Estuaries are characterised by the alternation and mix of fresh inland waters and salted marine waters and their loads: the invasion of marine water during high tide (the incoming tide), which can be spectacular (a tidal bore), and the outflow of river water during low tide (ebb tide). Thus every day, in time and space, complex variations occur in the degree of salinity, in currents, and in processes of deposit/erosion. In particular, this context favours the landing of solid loads and the flocculation of colloidal murky suspensions (formation of mud blocks), as well as the frequent movement of these deposits (bars). This silting requires frequent dredging for the maintenance of boat traffic. Such environments are rich in biotic potentialities. Their diversity in the matter of flora and fauna is of course considerable. Like many amphibious environments, estuaries are also privileged stopping places for migratory birds. They are also essential places for the passage of those sea fishes that spawn in fresh water. This permanently intermediary character, this mixing between sea and land, causes us to exclude from the category of the estuary the lower part of valleys invaded by the sea, through which watercourses run with a very low rate of flow: these forms are designated as ria (or aber for a ria shaped as a funnel widely opening out onto the sea). Yet another term - liman - is used to designate a broad estuary that is almost totally closed by a sandy spit, and is thus an intermediary form between lagoon and estuary.

In a world where the coasts and valleys of densely populated countries are raising increasingly important spatial issues, it is not surprising that estuaries, which provide connections between them, are of vital importance.

See also: coast, maritime character

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## **Bibliographie**

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