

## Tidal River Bores

In most tidal rivers the change from ebb to flood is a gradual process. The ebb current downstream slows, there is a period of slack water and then very slowly the flood tide starts flowing upstream. In a few rivers however, the behaviour is remarkably different. The onset of the flood tide is marked by a distinct and sometimes very vigorous wave called a bore.

Approximately 100 rivers around the world are known to produce bores, of which perhaps 20 or so are in the United Kingdom. This is a consequence of the large tidal ranges that occur in several locations around the British Isles.

### The Severn Bore

In the UK the most famous and spectacular example of a river bore is the Severn Bore, and as such it attracts thousands of tourists.

It can be seen as a wave or series of waves, sometimes 2 metres in height, that sweep up the River Severn, breaking in the shallows at the side of the river sometimes splashing onlookers! Being the onset of the flood tide it is accompanied by a rapid rise in water level which continues for about one and a half hours after the bore has passed. With the passage of the bore the whole character of the river changes instantly from a calm, tranquil slowly ebbing stream to a turbulent fast flowing river with a strong upstream current.

The turbulence following the bore stirs up the sediment so the river can appear to change colour. Often debris torn from the banks by the bore is caught in the after-rush sometimes including whole trees. At Maisemore the sound of the river passing over the weir and the sound of the bore rushing upstream are cancelled instantly as the bore simultaneously drowns the weir and is itself halted. There are many other interesting effects associated with the passage of the bore.

The Severn Bore can be seen from its first small beginnings near Sharpness all the way up to the Maisemore Weir above Gloucester. It is at its most developed between Minsterworth and Gloucester although it is certainly worth seeing in its estuary form above Newnham.

The bore occurs probably 250 times per year ranging from a small ripple to the highest waves. However, it is generally at its best when a very high spring tide is predicted, something in excess of 14 metres at Avonmouth. Hence there are probably just a few occasions in the year at the spring tides that occur closest to the equinoxes when the bores are at their most spectacular.

However a good bore cannot be guaranteed as it can be affected by other factors. For example if there is a lot of extra water in the river due to heavy rainfall the bore is diminished. This together with other factors such as wind can also alter the timing of the bore by perhaps a quarter of an hour or so. The approximate times to expect the bore at various locations



*River Severn bore – the most impressive of the 20 river bores you are likely to see in the UK.*



# National Oceanography Centre Marine Data Products

relative to High Water Avonmouth (HWA) are:

Newnham 15 min before HWA  
Epney 25 min after HWA  
Minsterworth 45 min after HWA  
Stonebench 1 hr after HWA  
Over Bridge 1 hr 20 min after HWA  
Maisemore 1 hr 25 min after HWA

The Severn Bore is more fully described in the book "The Severn Bore" by Fred Rowbotham (3<sup>rd</sup> edition 1983, David & Charles, Newton Abbott) and also in various

leaflets provided by the Severn Trent Water Authority.

Tidal predictions for Avonmouth and other ports can be found on the National Tidal and Sea Level Facility (NTSLF) website:

<http://www.ntsfl.org/>

The times shown on the site are UT, add 1 hour for British Summer Time.

## **The Qiantang Tidal River Bore**

The Qiantang bore is the largest tidal river bore in the world. It can be 4m

high, 3km wide and travel at speeds in excess of 15 mph. At certain locations reflected waves can reach 10m and the roar can be heard over an hour before its arrival.

When a large bore is forecast many people line the banks to watch its progress. Great care is required. Several tragic accidents have occurred when reflected waves suddenly increase the bore height and break over the banks washing away unwary people.



*The Qiantang Tidal River Bore*



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