

## Why is Chepstow the best place to see tides?

Chepstow's tides can rise **13.4m 44ft** in 4 hours and it can all be seen within only 50 metres of the river bank. Where else can you see tidal ranges of 13m at one place?

1. **Bay of Fundy, Canada** (16.2m) *but only* at the very far end of the bay. *Usually a long way from shore.* Most of the photographed places have 'shoreline' ranges less than 13m even though they are in Bay of Fundy.
2. **Ungava Bay** (15m) 500 miles N of Fundy. Frozen for 6 months. No roads or structures. Full range is offshore.
3. **Severn Estuary** (14.7m). Best place in world as full tide range is close inshore and against vertical structures (*but dock gates with full range are inaccessible*). Best: **Chepstow Bridge** (13.5m) - best for close up views. **Clevedon Pier** (14.4m) - best for wide views of Severn. **Beachley/Severn Bridge** and **Sudbrook** (up to 14.7m). Others incl. **Cardiff Barrage & Penarth Pier** (13.4m); **Newport City Centre** (11m) **Transporter Bridge** (13m) (*Docks 14m*); **Portishead, Pill.** **Bristol Clifton Br** (10m).
4. **NW France** - Granville and Cancale (14m) - full range is some way offshore. **Mt St Michel** impressive but tide 'range' at this end of the bay is half that at Chepstow.
5. **Other places** - the maximum tide ranges in Argentina, Alaska, NW Australia, and E. Russia are 12.5m or less. Locations are remote. Full range some way offshore.

**At Chepstow it can be seen 50 m from shore and 200 m from shops, pubs, a castle, and visitor attractions!**

The Moon passing the Earth (6 July 2016) (NASA/NOAA)

*Quite possibly one of the most incredible photographs you will ever see (left). A real image from NASA/NOAA Deep Space Climate Observatory satellite which also shows the 'Dark side' of the Moon (never seen from Earth). When this photo was taken, 1 million miles away, the Moon above Australia/NZ was raising the evening tide at Chepstow Bridge by 12m (40ft) (from 1.4 to 13.4m). The Moon makes a tidal bulge on both sides of Earth.*



On the right, 'super moon' of 14/11/16 above Chepstow Bridge.

## Chepstow - Other Local Sights



**Chepstow Bridge**  
1816, World's largest iron arch road bridge built before 1840.



**Rail Bridge 1852**  
Pillars of Brunel's ground breaking bridge remain.



**Severn Bridge 1966**  
World's 1<sup>st</sup> thin aerodynamic road deck - now on all big bridges



**Castle 1067**



**Town Gate 1524**



**Port Wall 1274**



**Museum**



**High Street**



**Racecourse**

Wales Coastal Path; Offa's Dyke Path; and Gloucestershire Way.

### Some things to know about the tides.

1. **Fast rising tides, strong currents** and **mud** in Severn and Wye are **dangerous**. Never step off paths. **Boating is dangerous**.
  2. **Tide height** is the total height of water above sea / river bed.
  3. **Tide range** is the height at High Water *less* the height at LW.
  4. **'Spring' Tides** occur every month. 'Spring' means to 'leap'.
  5. **Highest tides** are usually in Feb/Mar/April and Aug/Sep/Oct.
  6. **Highest and lowest tides** occur on the *same* day.
  7. **'Astronomical' Tide** is that raised by the Moon and Sun only. Maximum astronomical tide in Severn Estuary is 14.7m (48ft)
  8. **Storm-surges** (from strong SW winds/low air pressure), or High Rainfall/Snow Melt, can add 1 to 2 m to an astronomical tide.
  9. **Tide Tables** predict *astronomical tides* for the year. They can predict exact heights and times (to the minute) for 1,000 years!
  10. **Tide Table Heights** are predicted in m. Above 'Chart' Datum (CD is *sea bed* at the local port). Chepstow's HW height is similar to Avonmouth in Tables - but it arrives 20 mins later.
  11. **Flood Warnings** are in m. Above 'Ordnance' Datum (OD is *av. sea level for UK*). **Local warnings are in m. AOD 'at Newport'**.
  12. **CD at Avonmouth and Chepstow is minus 6.5m AOD** so a **14.5m tide is 8.0m AOD** - but same tide is **7.4m 'at Newport'**.
- NB. **Severn Bore** (2 metres high) starts 16 miles N. of Chepstow.

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# Chepstow's 'Mega' Tides

Information Leaflet

Earth is 250,000 miles away from the Moon but water on Earth is being moved by the Moon.



From Apollo 17 (carrying the last astronauts to visit the Moon). Photo: NASA - Dec. 1972

The influence of the Moon on our Earth is seen more dramatically in the Severn Estuary and at Chepstow than almost anywhere else on Earth - moving massive tides every day.

**Chepstow has the world's third highest tides - but is probably the best place in the world to observe the world's greatest tides.**

*Usually, in areas of high tides, the full tidal range is a long way off shore. At Chepstow almost the full tidal range possible in the world can be seen within 50 metres.*

**On Chepstow Bridge, by the Castle, you stand directly above surging water being moved by the Moon.**



Lowest Astronomical Tides at Chepstow Bridge 1.2m

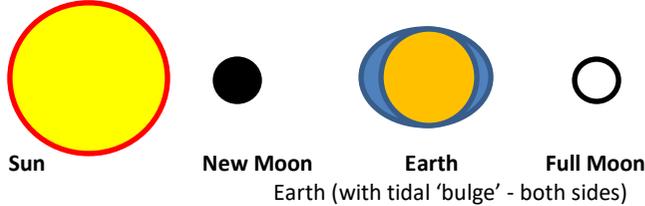


Highest Astronomical Tides at Chepstow Bridge 14.6m

**Chepstow's incredible 'reversing river'**  
The River Wye flows north twice a day **and** south twice a day!

## Astronomical Tides - the Moon and the Sun

The largest force on our planet is shown at its best at Chepstow! The gravitational pull of the **two largest objects in our sky**, the Sun (33%) and the Moon (66%), affects land and sea but only water is seen to move - producing a rise in the oceans of perhaps 0.5m. When this **0.5m 'wave'** reaches the coastline it is magnified according to the shape of the coastline usually to **1 or 2 metres**. In the Bays of Fundy, Ungava, St. Malo, and in the Bristol Channel, the magnification produces the world's highest tides - **over 14m**. Highest tides occur when the Moon is in line with Sun and Earth.



## Best times to see the tides

To see the full range you need to re-visit same place 6 hours later which is why Chepstow is such a good place to see the tides - there are shops, pubs, restaurants, and things to see - Chepstow Castle, Priory, Town Arch, Museum etc. Make a day of it at Chepstow.



Highest 'spring' tides are usually in the morning sometime between 8am and 10am and Lowest Tides are usually between 3pm and 6pm. *Arrowsmith's Tide Tables* (available from Chepstow Bookshop - St Mary's St.) and [easytide.co.uk](http://easytide.co.uk) gives heights and times. **Chepstow is a similar height to Avonmouth but 20 minutes later.** On a very low tide day the **turn of the tide is worth waiting for.** The sound of the river over the stones **stops suddenly and everything goes quiet**, the river changes direction and starts to rise quickly at 3m **10ft** per hour.

## World's highest tides - the 'mega' tides - 12m+

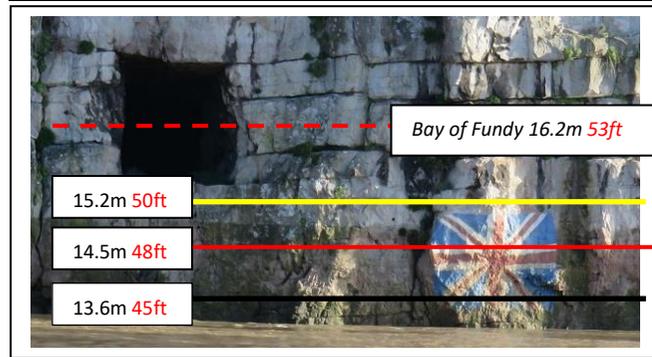
The Severn has the world's 2<sup>nd</sup> highest **average** tidal range but probably the 3<sup>rd</sup> highest extreme range. Ungava Bay may be 2<sup>nd</sup>. However, the extreme tides in Bays of Fundy and Ungava are only slightly higher (height of a table or a door) than those in the Severn Estuary and at Chepstow!

	Location of world's highest tides	Av.	Highest Tides	
1	Bay of Fundy, E Canada, Burntcoat Hd	12.0	16.2	53
2	Ungava Bay, NE Canada	8.8	15.0	49
3	Severn Estuary, SW UK - Wales & Eng.	9.2	14.7	48
4	Golf St Malo - Baie du Mt St Michel, Fr.	8.0	14.2	46
5	South East Argentina - Rio Gallegos	7.0	12.7	42
6	NW Australia - Shale Is. nr Derby	6.6	12.5	41
7	Alaska - Turnagain Arm nr Anchorage	6.5	12.5	41

Data from : UK Hydrographic Office - [www.ukho.gov.uk/easytide](http://www.ukho.gov.uk/easytide)

**Next Highest: 10-11m:** Baffin Is.; SE Chile; NE. Russia; E. China; NW India; Korea; Liverpool & Morecambe Bays, UK; NE France.

## How high is the tide today?



## 5 billion tons of water in 6 hours

The tide will bring **5 billion tons of water** into the **Severn Estuary between Cardiff and Sharpness** in 6 hours (and four times more into the Bristol Channel). **How much is 5bn?** Just to bring 5 billion tons of water **by road** would need a queue of tankers in all 3 lanes of the westbound M4 stretching back to London, Dover, and then



all the way across Europe and Asia to Singapore, and then on an imaginary floating 3 lane viaduct across to Australia, across the Pacific Ocean and North America, then across the Atlantic Ocean! The queue of lorries 3 deep would stretch around the Earth and back to the UK - **and then** another '20 times' around the Earth! 3 years to deliver one tide. **The Moon, with help from the Sun, does it in 6 hours - twice a day!** - and not a bucket or lorry in sight.

## For AOD 'at Chepstow'

subtract **6.5m** from the red scale eg. a **14.5m** tide is (14.5m - 6.5m) = **8.0m AOD 'at Chepstow'**.

The same tide is **'7.4m' AOD 'at Newport'**. Very high.

Rocks under central arch visible when river v. low 1.2m - 1.4m.

Lowest low tide level. Fresh water. 1.2m 4ft (1.4m 4.6ft under bridge)

A 0.5m high concrete block starts to appear when river falls to 1.7m 5.6ft in front of Bandstand area. If fully exposed (pic) then river 1.2m.



Chepstow is no longer on lists of the world's highest tides as UKHO no longer records Chepstow's tides - but it's still one of the highest.. Data from author's measurements.

## Tidal 'Height' and Tidal 'Range' at Chepstow

**Height:** Moon/Sun can raise the tide in the Wye and Severn by **14.7m (48ft)** maximum. A rare **storm surge** could add 1m+, so Chepstow's 'highest' tides are 14.5m **48ft** up to 15.2m **50ft**.  
**Range:** At Chepstow the range *would be* 14.7m (river bed to high tide) **but** the Wye always has at least 1.2m **4ft** of fresh water so the local tide range is '14.7m - 1.2m' = **13.5m (44 ft)**. Above 14.7m of HW the LW rises also, so range is still 13.5m. At Thornwell and Mouth of the Wye the range can be 14m+. Guinness Book of Records 1<sup>st</sup> Edition (1955) lists Chepstow as recording Europe's highest tidal range in 1883.

## Some of Highest Storm Tides at Chepstow (from CD of -6.5m AOD)

**1607** Famous storm surge (likened to a tsunami) c.15m **49ft**.  
**1703** Probably worst storm of last 500 years. Up to 17m **56ft**?  
**1815** Measured by Rastrick - work on 1816 bridge. 15.6m **51ft**  
**1883** Mark on Bridge 15.4m **50ft**. Guinness Record range 14.8m.  
**1981** 13 Dec. 15.5m (9m AOD, 8.4m at Newport); **1999** 24 Dec. **2014** 3 Jan. 15.2m **49.8ft** (8.7m AOD Chepstow/8.1m Newport)  
**2015** 21 Feb Highest 'astronomical' tide for 25 years 14.64m.