Flood Risk

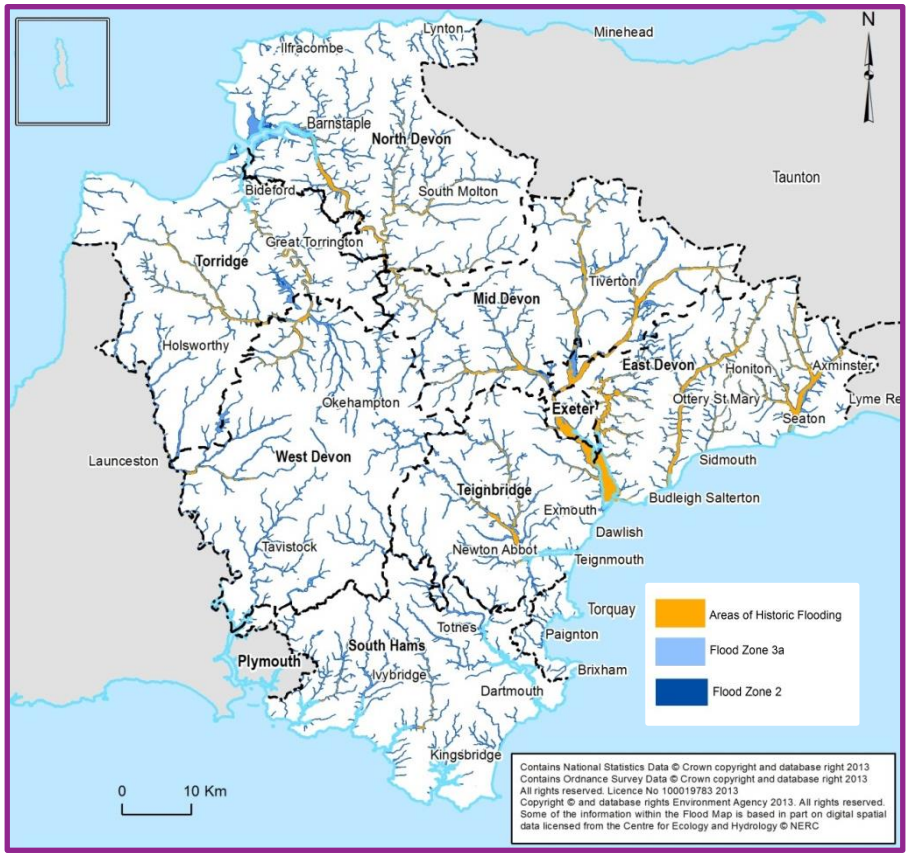
Throughout this document 'Devon' refers to the administrative area of Devon County Council and 'Torbay' refers to the administrative area of Torbay Council. Italic hyperlinks will open the interactive Devon County Council Environment Viewer.

Economic Prosperity, Health and Wellbeing

Economic damage due to flooding in Devon, Plymouth and Torbay currently costs £81m per year and its effects are felt across the area - 30% of businesses sampled in Devon reported having been negatively affected by the notable floods of 2012. The agriculture and tourism sectors were the worst affected[i]. Due to increasing urbanisation and the changing climate, the economic damage due to flooding in 2100 is estimated to rise to £1b per year if no further measures are implemented, principally due to the risk of tidal flooding[ii]. Flooding presents a number of risks to health including drowning; disease outbreak from sewage and stagnant water; and serious injury caused by falling into fast flowing water or from hidden dangers under the water[iii]. Flooding can seriously undermine the mental health of communities that are impacted or those that fear they may be in the future[iv].

Flooding from the River Clyst at Topsham – November 2012

Map 1 – Areas at Risk of Flooding from Rivers and Sea



Risk of Flooding

Devon's Preliminary Flood Risk Assessment[v] (PFRA) identifies 30,800 residential properties at risk from *surface water flooding* more than 0.3m deep from a 1 in 200 year rainfall event. This ranks Devon as the 8th most vulnerable area to surface water flooding nationally. Torbay's PFRA identifies 5,100 residential properties at risk[vi].

The areas of High Bickington; Tiverton; Cullompton; Crediton; Kingsteignton; Newton Abbot;

Rydon Stream Catchment; Starcross; Dawlish; and Dawlish Warren have been identified as being particularly susceptible to groundwater flooding[vii].

Table 1 – Residential Properties Within Flood Zones 2 and 3a		
	Devon	**Torbay**
Flood Zone 2 (Between 1 in 100 and 1 in 1,000 annual probability of river flooding, or between 1 in 200 and 1 in 1,000 annual probability of sea flooding if there were no defences)	**33,375**	**2,408**
Flood Zone 3a (1 in 100 or greater annual probability of river flooding, or a 1 in 200 or greater annual probability of flooding from sea if there were no defences)	**28,398**	**2,012**

Map 1 illustrates areas of historic flooding and land assessed as being at *risk of flooding from main rivers and sea*. The Environment Agency defines areas at risk of flooding from rivers or sea by different Flood Zones. Zone 1 are areas with low probability of flooding, Zone 2 are areas with a medium probability, Zone 3a are high probability and Zone 3b is the functional floodplain or land where water has to flow to be stored in times of flood. Table 1[viii] shows the number of properties in Devon and Torbay that are estimated to be within Flood Zone 2 and Flood Zone 3a. It is anticipated that without remedial action flooding events will increase in magnitude and frequency as a consequence of climate change. Whilst there remains some uncertainty surrounding the scale of these changes, the latest climate change projections for Devon and Torbay predict an increase in peak river flows of up to 30% by 2055 and an increase in winter rainfall totals of 15 to 20%[ix].

Flood Defences

There are numerous *flood defences* located along Devon and Torbay watercourses including a number of flood storage areas. In addition, there are many public open spaces which have potential for flood storage through natural inundation or man-made sustainable drainage systems.

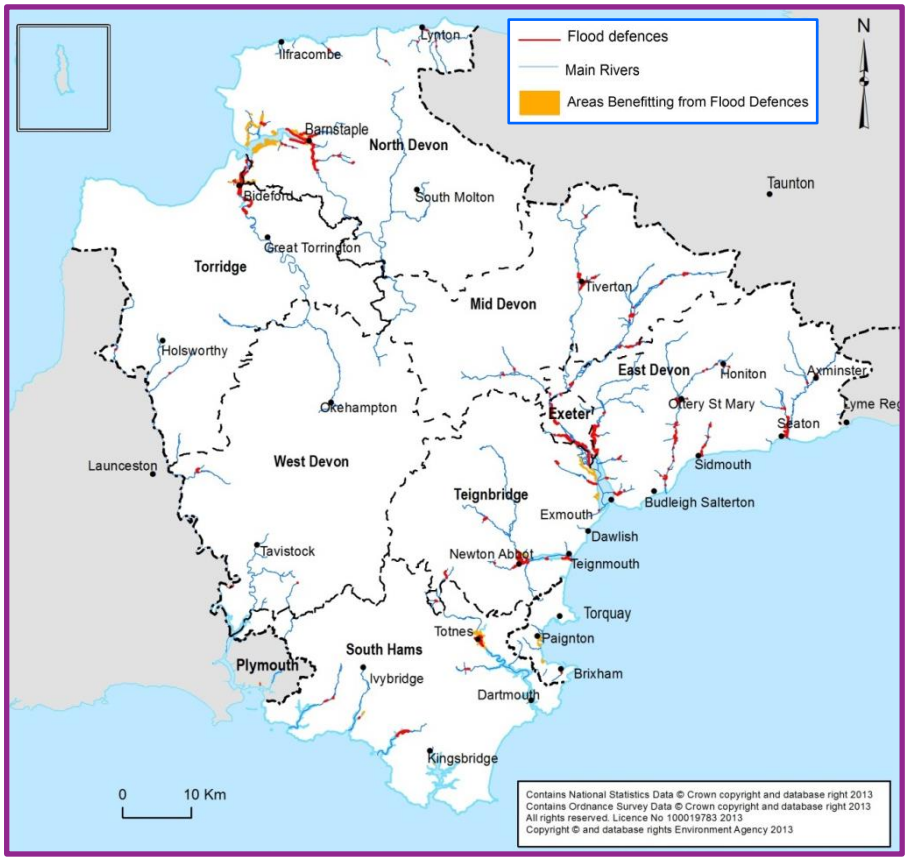
Due to the coastal location of Devon and Torbay there are a number of coastal defences including sea walls, revetments to harbour walls, groynes, natural beaches, cliffs and the rip rap offshore breakwaters as seen at Sidmouth. Existing flood defences are shown on Map 2[x] along with an indication of the areas benefitting from some form of watercourse or coastal flood defence.

Flood Events

Torbay has experienced nine significant (defined locally as more than 30 properties flooded) flood events since 1991 attributable to surface water, ordinary watercourse and groundwater flooding[xi]. The most significant of these was in 1999 when 162 properties were flooded in Torquay and Paignton. In addition to the nine significant flood events identified, Torbay has also experienced a further thirteen flooding events between 1991 and 2017 where between five and 30 properties have been affected. From 2012 to 2017 Devon experienced 58 significant (defined locally as more than 5 properties) flood events from surface water, ordinary watercourses or groundwater. The largest of these occurred in East Devon in October 2008 and affected 334 properties[xii].

2012 was the second wettest year on record in the UK[xiii]. Devon suffered two, long duration, fluvial flood events in November and December 2012 resulting in the flooding of approximately 450[xiv]and 327[xv] residential and commercial properties distributed across the county. In Torbay, 30 properties reported flooding in various locations in early October 2012[xvi] and a further 58 in November[xvii].

Map 2 – Flood Defences



[i] SQW (2013) *Impact of flooding on key business sectors on Devon 2012-13.* SQW. Available at http://www.devonomics.info/sites/default/files/documents/Devon%20&%20Somerset%20Flood%20Results%20Final%20Report.pdf (Accessed 12/08/13)

[ii] Environment Agency (2009) *Catchment Flood Management Plans – East Devon, Exe, North Devon, South Devon, Tamar*. Environment Agency.

[iii] Health Protection Agency (2012) *Flooding* [online]. URL:http://www.hpa.org.uk/flooding (Accessed 22/08/13)

[iv] Environment Agency (2013) *Health and Wellbeing.* Environment Agency. Available at: http://www.environment-agency.gov.uk/research/policy/132337.aspx (Accessed: 03/05/2013)

[v] Devon County Council (2011) *Preliminary Flood Risk Assessment Report.* Devon County Council. Available at http://www.devon.gov.uk/devonpfra.pdf

[vi] Torbay Council (2011) *Preliminary Flood Risk Assessment Report.* Torbay Council. Available at http://www.torbay.gov.uk/index/yourbay/environment/pfra.pdf

[vii] Devon County Council (2011) *Preliminary Flood Risk Assessment Report.* Devon County Council. Available at http://www.devon.gov.uk/devonpfra.pdf

[viii] Calculated by overlaying National Receptors Database 2014 residential property information ("mcmcode" = 1) with the extent of flood zones 2 and 3a.

[ix] EA, DEFRA & Local Government Association (2011) *Climate Change information for Local Flood Risk Management Strategies - South West River Basin District Map.* Available at http://www.environment-agency.gov.uk/research/planning/135749.aspx (Accessed: 08/08/2013)

[x] Devon County Council (2013) *Data supplied by Devon County Council*

[xi] Torbay Council (2011) *Preliminary Flood Risk Assessment Report.* Torbay Council. Available at: http://www.torbay.gov.uk/index/yourbay/environment/pfra.pdf (Accessed: 16/09/2013)

New: Data supplied by Torbay Council Development Agency

[xii] Devon County Council (2011) *Preliminary Flood Risk Assessment Report.* Devon County Council. Available at http://www.devon.gov.uk/devonpfra.pdf

New: Data supplied by Devon County Council Flood and Coastal Risk Management Team 2017

[xiii] Met Office (2013) *Statistics for December 2012* [online]. URL: http://www.metoffice.gov.uk/news/releases/archive/2013/2012-weather-statistics (Accessed 5/2/14)

[xiv] Devon County Council (2013) *Devon Floods 21st – 25th November 2012.* Devon County Council. Available at http://www.devon.gov.uk/devon_november_floods_2012_final.pdf

[xv] Devon County Council (2013) *Devon Floods 19th – 24th December 2012*. Devon County Council. Available at http://www.devon.gov.uk/devon_december_floods_2012_report_final.pdf

[xvi] Torbay Council (2012) *Flood Investigation Report – 6th October 2012*. Torbay Council

[xvii] Torbay Council (2012) *Flood Investigation Report – 21st – 26th November 2012.* Torbay Council