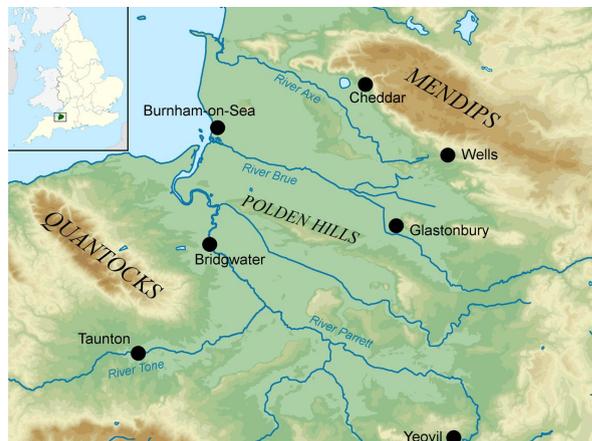


The Challenge of Natural Hazards: Somerset Levels Floods

The Somerset Levels

The Somerset Levels are an area of low-lying **coastal plains** and **wetlands** located in the **south-west** of the UK in the county of **Somerset**.

Several rivers flow through the Somerset Levels and drain into the Bristol Channel, notably the **River Tone** and **River Parrett**. The low-lying nature of the area makes it **prone to flooding**, and **settlements** and **agricultural land** on the levels have experienced flooding events for centuries.



(Source: Ordnance Survey)

Causes of the 2014 Somerset Levels Floods

In the **winter of 2013-2014**, the Somerset Levels experienced **very severe and extensive** flooding.

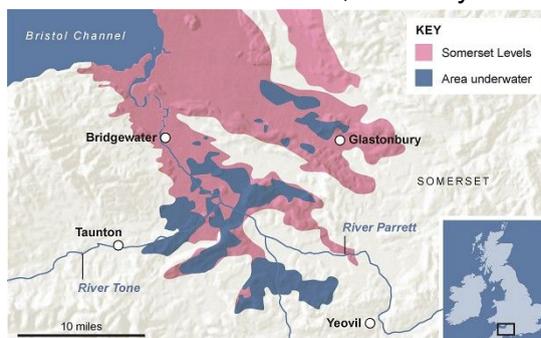
From December 2013 - February 2014, several major flooding incidents occurred on the Somerset Levels, affecting **thousands of people** and causing **widespread damage**.

Several factors contributed to the Somerset Levels floods:



(Source: Matt Cardy/Getty Images)

- **Rain:** A series of **depressions** (low pressure areas causing heavy rain) off the Atlantic Ocean hit the south-west UK, bringing **weeks of wet weather**. January 2014 was the wettest on record, and around **350mm of rain fell in January and February** (100mm above average). This caused rivers to overflow and burst their banks onto the floodplains.
- **High tides:** Seawater levels were **higher** due to **high tides** and **storm surges** brought by the Atlantic depressions. The high tides **prevented freshwater** from being able to drain into the sea, which made river levels **rise further**.
- **Dredging:** Rivers were full of **sediment** as they had not been **dredged in over 20 years**. This meant less water could be held in the river channel, and they overflowed quicker.



Areas under water as of January 2014. (Source: www.telegraph.co.uk)

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Effects of the Somerset Levels Floods

The Somerset Levels Floods had **social**, **economic** and **environmental** impacts.

Social	Economic	Environmental
<ul style="list-style-type: none"> Over 600 homes flooded.  <p><i>A home in Muchelney.</i> (Source: Matt Cardy/Getty Images)</p> <ul style="list-style-type: none"> Residents were evacuated into temporary accommodation, for months in some cases. 16 farms had to be evacuated. 	<ul style="list-style-type: none"> Cost of damage estimated to be over £10 million according to Somerset County Council.  <p><i>A damaged home in Thorney.</i> (Source: Matt Cardy/Getty)</p> <ul style="list-style-type: none"> Agricultural land flooded - over 14,000 ha of agricultural land was underwater for 3-4 weeks. 	<ul style="list-style-type: none"> Sewage, chemicals like pesticides and oil contaminated the floodwater, which spread to other areas.  <p><i>A crane foraging during floods.</i> (Source: ITV West Country)</p> <ul style="list-style-type: none"> Flooding destroyed ecosystems and limited food supplies for animals. Debris had to be cleared after flood water deposited it around the area.
 <p><i>Residents transported by boat.</i> (Source: Ben Stansall/AFP/Getty)</p> <ul style="list-style-type: none"> Power supplies were cut off in areas. People's livelihoods and lifestyles were severely disrupted by the floods, e.g. shopping, going to work, going to school. Some villages, such as Moorland and Muchelney were completely cut off and left people stranded. 	 <p><i>Flooded farmland in Burrowbridge</i> (Source: Tim Ireland/PA)</p> <ul style="list-style-type: none"> Over 1000 livestock had to be evacuated. Many people couldn't go to work as jobs were disrupted and roads were cut off, affecting the economy. Bristol to Taunton railway line was closed at Bridgwater after flooding. 	 <p><i>Debris washed up on a farm.</i> (Source: Matt Cardy/Getty Images)</p> <ul style="list-style-type: none"> Stagnant water was left deoxygenated after standing for months. Water had to be reoxygenated before being pumped back into rivers.
 <p><i>Moorland in February.</i> (Source: Getty)</p>	 <p><i>Flooded railway line in Somerset.</i> (Source: CountyGazette)</p>	 <p><i>A pump outlet pumping flood water back into a river.</i> (Source: Matt Cardy/Getty)</p>



Flooding Management Strategies on the Somerset Levels

The Somerset council and the UK government's response to the Somerset Levels floods not only **immediately reduced the risks during** the flood event, but - in the **long-term** - also aim to **reduce the risks** of **future** flooding events.

Immediate Responses

Warnings

Weather and flood warnings were released to **warn residents of the danger**, and at risk residents were also **contacted** by local authorities and told to evacuate. The **Environment Agency** issues **severe flood warnings**, meaning there is a 'danger to life'. The **monitoring** of river levels allowed the Environment Agency to make proper judgements on what areas were under threat, **managing the risks** of the flooding.



Temporary Flood Defences

In some places, temporary flood defences such as **barriers** and **sandbags** were placed to try to control the flood water, particularly to **reduce the amount entering homes**. Many residents moved **valuable items upstairs** away from the risk of floodwater, limiting the damage to their property. (Source: bbc.co.uk/news/uk-england-somerset-26046813)



Long-term Responses

The **Somerset Levels & Moors Flood Action Plan** is a **20-year plan** that was developed after the 2014 floods. The Flood Action Plan aims to reduce the risk of future flooding through management of the river and the Somerset area. The plan aims to do the following:

Management Strategy	Aim	Progress So Far
Dredging  (Source: PA)	Dredge 8km of the River Tone and River Parratt to increase the capacity of the river channel and reduce the risk of the river bursting its banks .	4km in the River Tone and 4km in the River Parratt was dredged in 2014, removing 130,000 cubic metres of silt. Maintenance dredging has taken place every year since, and there are plans to dredge other areas of the rivers.
Drain enhancements  (Source: Somerset Rivers Authority)	Develop better drainage so that expensive pumping mechanisms do not need to be relied upon during future flooding events.	Culverts (large drainage tunnels under roads) have been added on several main roads. The roads have also been raised to help with drainage and reduce flooding risk.



Management Strategy	Aim	Progress So Far
<p>Bridgwater tidal barrier</p>  <p><i>Artist's impression of the barrier.</i> (Source: gov.uk)</p>	<p>Construction of a huge tidal barrier at Bridgwater, which would stop high tides contributing to floods.</p>	<p>The Somerset Rivers Authority claims it is on track for the Bridgwater tidal barrier to be completed by 2024.</p> <p>The barrier would potentially protect at least 11,300 homes and 1,500 businesses.</p>
<p>Somerset Rivers Authority</p> 	<p>Establish an authority that is responsible for effective river management on the Levels.</p>	<p>In 2015, the Somerset Rivers Authority (SRA) was launched. The body works to maintain and improve river management in Somerset. www.somersetiversauthority.org.uk/</p>
<p>Urban Water Management</p>  <p><i>Permeable urban surfacing.</i> (Source: sustainable-urban-drainage-systems.co.uk/)</p>	<p>Better management of urban run-off and implementation of sustainable drainage systems.</p>	<p>A review into 20 urban sites has been conducted by the SRA and specific drainage guidance has been given.</p> <p>Guidance is given to developers of new urban sites to ensure their developments comply with Sustainable Drainage Systems (SuDS) guidelines.</p>
<p>Increased Resilience</p>  <p>(Source: Somerset Rivers Authority)</p>	<p>Sustain and enhance community and business resilience to future flood events.</p>	<p>The SRA implemented a Community Resilience Officer, who helped communities by delivering community flood resilience plans door-to-door, explaining how to prepare for future floods.</p> <p>The SRA also offers free training on how to best prepare for a flood, and provides information on affordable insurance, grants etc.</p>

