

An Introduction to Reservoir Flooding



Toddbrook Reservoir from the southerly slope of Hawkhurst Head
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Introduction

Reservoirs are areas where large volumes of water can be stored. Uncontrolled releases of this water body can cause flooding which can be catastrophic and cause extensive damage to land and properties both in the immediate and neighbouring areas. Some of the causes of reservoir flooding may include:

- Prolonged periods of heavy and intense rainfall.
- Improper maintenance.
- Water flowing over the top of the dam.
- A leak from the dam or embankment structure.
- Slope instability
- Cracks in the dam or embankment structure.
- A landslide down an embankment of a reservoir.

Possible impacts of reservoir structure failure

- Unexpected widespread flooding.
- Homes and businesses can be destroyed.
- Severe damage to infrastructure.
- Habitats destroyed or relocated.
- Loss of life.



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How to prepare for reservoir flooding

If you live in close proximity to a reservoir, it is important to be aware of your flood risk and how you can prepare. It is not only the areas immediately adjacent to the reservoir that can be affected, but those several miles away too. There are a number of ways you can prepare for the unlikely but possible event of reservoir flooding:

- Check your flood risk on the Environment Agency's long term flood risk map.
- Prepare a flood kit which contains items that you may need in an emergency. Information on what you could put in your flood kit can be found in the "household" section of the Flood Hub.

- Get together a list of useful contact details you may need in the event of a flood, such as your insurance company, utility suppliers, your local council, family, friends and relatives.
- Keep important documents in waterproof storage or saved on a memory stick and stored upstairs. Those documents you may need in the aftermath of a flood should be taken with you.
- Install some resistance and resilience measures to your property.
- Plan ahead and think about alternative accommodation if there was a breach.

Management of reservoirs

If you own or operate a reservoir, there are certain requirements which must be met and different sized reservoirs have different requirements. 'Large raised reservoirs' are those which hold at least 25,000 cubic metres of water above ground level and they must be registered with the Environment Agency. In order to register a reservoir, you will need to provide the:

- Name of the reservoir
- Grid reference - you can find this on the Ordnance Survey map.
- Name and address of the reservoir owners or operators.
- Date construction was completed.
- Height of dam (the level in relation to the surrounding ground levels).

- Level of the top of the dam (the level relative to the ordnance datum) and top water level.
- Capacity of dam.
- Water surface area.
- Name and address of the panel engineers.
- List of any certificates issued by panel engineers.
- Date when the next inspection is due.

You also need to state which type of reservoir you have:

- Impounding (blocks the natural flow of a river or drainage from an area).
- Non-impounding (filled by pumping water or by piped inflow of water).

There are additional requirements for those reservoirs that the Environment Agency decides are 'high risk' (those which could put people's lives at risk if there was an uncontrolled release of water). Reservoirs in England have an excellent safety record with the last fatal dam failure nearly 100 years ago.

Large reservoirs in England are regulated by the Reservoirs Act 1975 and must be assigned a supervising civil engineer and an inspecting civil engineer. The legislation is enforced by the Environment Agency and requires reservoirs to be inspected and maintained to an appropriate standard to

to ensure high levels of safety and that the chance of failure is very low. The responsibility for ensuring the safety of reservoirs lies with their operators, they must comply with the safety requirements that are enforced by the Environment Agency.

Reservoir decommissioning

In the UK, reservoirs were built for many reasons such as supplying drinking water to nearby towns and cities, water storage, irrigation, to fill local canals and rivers in periods of low rainfall and for recreational reasons such as fishing and sailing. However, a number of dams are no longer in use and are being decommissioned, this can be due to a number of reasons, for example, their age and a lack of maintenance or risk of failure from slope instability or structural damage. Once decommissioned, reservoirs can be a haven for local wildlife and fish and can increase the biodiversity of an area, as some of the dams and structures which are put in place to create some reservoirs can disrupt natural fish migration paths. It is important that reservoirs and dams are regularly checked to ensure they are safe and if necessary, decommissioned.



The Old Michael Reservoir (disused)
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Case study: Toddbrook Reservoir, Whaley Bridge

On the 1st August 2019, 1500 homes and businesses had to be evacuated from the town of Whaley Bridge due to a section of the spillway wall collapsing at the Toddbrook reservoir. The emergency services, Environment Agency and reservoir operators began pumping water from the reservoir which held around 300 million gallons of water, due to fears that the reservoir could burst and cause huge volumes of water to inundate the town.

An emergency evacuation centre was set up at a local school where residents gathered with their pets and essential medication. A severe flood warning was issued by the Environment Agency which signaled that there was a threat to life. The neighbouring villages of Furness Vale and New Mills were also evacuated. The RAF deployed a chinook helicopter which dropped hundreds of one tonne bags filled with aggregate to try and stabilise the spillway.

By Tuesday 6th August, the emergency services and numerous agency workers were able to reduce the depth of water in the reservoir by over nine metres. Some residents were able to return home on the 6th with the rest returning on the 7th. The potential dam collapse could have been catastrophic, lives could have been lost and homes and businesses destroyed.



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Sources used: .Gov.uk website, Environment Agency, BBC, Canal and Rivers Trust, Water Projects Online and Lancashire Telegraph