

# Lessons Learned from a flash flood

## Narrative

A group of ten to thirteen year olds were preparing to start a descent of a popular gorge in Scotland when the water level unexpectedly and dramatically started to rise. Two separate weather-forecasts from that morning had not given rise to concern. One of the two instructors later described the rapid rise as a surge wave of about a meter in height. Within the next few minutes she gathered most of the group in a relatively sheltered area, noted that two young people were isolated, but safe on a separate rock, and one individual had exited the water on the far bank.

She also managed to make an emergency call by mobile phone to the outdoor centre where the group were based. The two isolated individuals were recovered, using equipment carried, and her assistant went to the far bank via a bridge to accompany the young person on that side of the gorge.

Contact between the group at the gorge and the centre manager and his team appears to have been broken, but it would appear that the emergency situation was quickly controlled, possibly within a matter of minutes. The river continued in spate condition.

Meanwhile, the centre manager had initiated an in-house emergency response and drove with two other instructors to the venue. They in turn called the Police by mobile phone to initiate an emergency services response.

On arrival at the gorge the centre manager was informed by the Police that the group were all safe but that the two instructors had been charged with culpably and recklessly taking a group of nine children into the 300 foot deep gorge. At a much later stage all charges were dropped.

## Lessons Learned

1. Don't make assumptions about how hazardous conditions can arise. Historically it had been considered that such flash flooding in the gorge could only arise as a result of dams and sluices up-stream being opened as part of the water management of hydro-electric schemes. Investigations revealed that this was NOT the cause of the rapid rise in this case.
2. Environmental protection agencies (the Scottish Environmental Protection Agency in Scotland and the Environment Agency in England and Wales) will have data on the flow rates on many watercourses. Where a river is known to be prone to flash flooding their advice should be sought as part of the process of assessing the extent of this risk, and identifying appropriate safety measures.
3. It should be noted that a sudden and rapid rise in water levels and flow rates can occur a long way from the scene of the weather event. This should be taken into account when assessing the flash flood causes and risk.
4. Natural causes are mostly to do with run-off rates within the catchment area upstream. Lakes and ponds, and their underground equivalent, aquifers, fill up steadily but release normal rates right up to the point where the reservoir of water is full, and then dramatically the outflow increases to the same rate as the now possibly thunderous inflow. The result is a flood surge down stream.
5. Man-made causes may include, in addition to hydro-electric and similar dams, drainage ditches protecting major roads, and similar channelling of a number of smaller streams into a single artificial watercourse. The effect is to create a form of barrier to the catchment, collecting and redirecting the waters to an alternative destination. This barrier acts as a sort of aquifer, filling up steadily then over-flowing catastrophically.
6. If gorges are used which are prone to flooding, and this will include almost all gorges, then the key issue is not "can you predict when it will happen", but "can you predict when it will not happen". Addressing the latter question should ensure that venues with the potential to flash flood may continue to be safely accessed. This will require access to reliable weather forecasting, and records of recent precipitation data for the catchment area.
7. The assumptions and concerns of the police in this incident are interesting. Activity providers should note that what may be a 'managed incident' to them may appear as 'reckless endangerment' to others. In this case the centre was able (eventually) to satisfy the police that their management of this activity had been well thought through, and that their subsequent internal investigation had brought to light causes which had not previously been understood.

**The Lessons Learned Group is a small group of professionals and enthusiasts in adventure activities, brought together by a common aim to incorporate any lessons that can be learned from accidents into ongoing good practice.**

**Our intention is to present an objective summary of an incident together with possible lessons. We do not aim to allocate blame or responsibility and our report represents the views of the individual members of LLG and not of any official body.**

**Information not currently available to us may render our comments inaccurate and the lessons identified may or may not have influenced the actual outcome. Any report published has been agreed by at least four individuals within the Group as meeting these aims.**  
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