Freezing Conditions on the River Severn

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Was it a premonition when a short article appeared in the last Review which featured a sheep roast and ice skating on the frozen River Severn in 1890? How strange then that 2010 provide the conditions for ice to be seen on the river reminiscent of colder times.

There is no doubt that there have not been many occasions when the large rivers have frozen over in recent years and this contrasts with the time, made familiar by Dickens, when rivers regularly froze over and had ice thick enough to carry people's weight. This was all part of the so called little ice age in the 1600, 1700 and 1800's which gave extreme and prolonged cold weather giving rise to great difficulties for agriculture and commerce. Historically, since 1142, there have been 40 occasions when conditions have allowed big rivers like the Severn to freeze over. It became such a frequent event in the late 16th Century that the Tudors enjoyed walking and sledging on the River Thames on several occasions. In 1608 frozen rivers gave rise to what was to become the first Frost Fair when stalls, events and river crossings were enjoyed for the duration of the cold weather. There were about 10 frost fairs on the Thames and during a five day fair in 1813, it is said that an elephant was paraded across the river. Although not quite so organised on the River Severn, there were still events there during the years 1620, 1622, 1795 and finally in 1855 when a printing press was set up and hand bills produced to commemorate the event. Finally as we saw in the last Review there was skating at Bewdley in 1890.

The last real Frost Fair was in 1815 but there were about 10 occasions when the rivers froze in the 19th century, the same as there were in the 17th and 18th centuries. In the 19th Century the years 1855, 1879, 1883, 1890 and 1895 were all recorded as times when the Severn froze over. Since then we have not had the prolonged cold weather that is needed to develop ice on a large river. In the 20th Century we may remember the winters of 1962 and 1981/2, both of which gave rise to ice flows on the rivers. In 1981, at Worcester before the culture of Health and Safety, people were able to walk across the river at one point. The sort of weather that is needed to allow intense cold to form over the British Isles is a development of static high pressure drawing air in from Northern Europe or the arctic regions. To get ice to develop on the rivers, at least a week of sub zero temperatures is needed.

Since official meteorological records began in 1878, 2010 had the coldest December we have experienced and when looking at the coldest months, Feb 1895 came first, followed by Jan 1963, Jan 1940, Jan 1881, Dec 2010 and Feb 1947. All those years experienced ice on the rivers.

To get ice forming on a river requires sustained periods of cold conditions because, unlike still water which freezes evenly down from the surface, rivers have moving water that is constantly mixing. This physically prevents the ice crystals from joining and forming a sheet and so a sort of slush is initially formed which floats on the surface. Eventually with continued cold weather the slush develops into pancakes of more solid ice which give the floating masses that develop on the surface and collect at pinch points like bridges and weirs. If there is a sustained sharp drop in temperature then the pancake ice can completely cover the river giving a very lumpy appearance. Where there is little or no water movement at the edges, border ice forms along the banks. If the cold weather continues the colder conditions around the banks encourages ice to develop right across the river completely covering the surface and this sort of slow covering of ice takes several weeks. This is the stage that the Severn was approaching in December 2010 and it was definitely not strong enough to carry a person. Whether there is a rapid freeze covering the river by pancake ice or the slow build up of flat ice, it is then a matter of time as to how thick the ice will develop. In England it would be unusual to get ice thicker than a few centimetres on rivers because we don't get prolonged cold periods and there is always a high proportion of warmer groundwater entering the river. Nowadays there are also power stations and sewage works that all add heat to the river. Usually most ice forms upstream of a bridge and in the photo taken at Bewdley Bridge on Christmas Day, there were large areas of ice upstream and open water downstream. On the same day at another pinch point down at Blackstone Rock floating ice was getting jammed and could be heard creaking as it tried to force through the gap. All sorts of birds like Goosander, Goldeneye, Mandarin, Smew and even Water Rail left their secluded tributary valleys and were seen over Christmas on the river as they gathered at the unfrozen areas.

River temperatures recorded at the Environment Agency Flow gauge at Bewdley showed the river temperatures never got less than -0.5°C. Deeper in the water column it was slightly warmer at around zero degrees. The air temperatures that lead to these freezing conditions started on the 25th of November and lasted to the 6th December when there was a succession of very cold nights but just above freezing days. This was followed by a second cold period from the 16th December to the 26th December, when night temperatures never rose above -3.0°C and even reached -10°C, while the daytime temperatures hovered between -1.0 and -5.0°C. Sylvia Sheldon at Knowles Mill recorded a record low of -14°C on the morning of the 26th December. Time will tell if this is to be the only river freeze we have in the 21st century.

This article is an extract from the Wyre Forest Study Group annual Review 2010

Wyre Forest Study Group

Frozen River Severn, Bewdley, 25 December 2010 Mike Averill

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Frozen River Severn Bewdley, 26 December 2010 Rosemary Winnal

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