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## FEATURE ARTICLE

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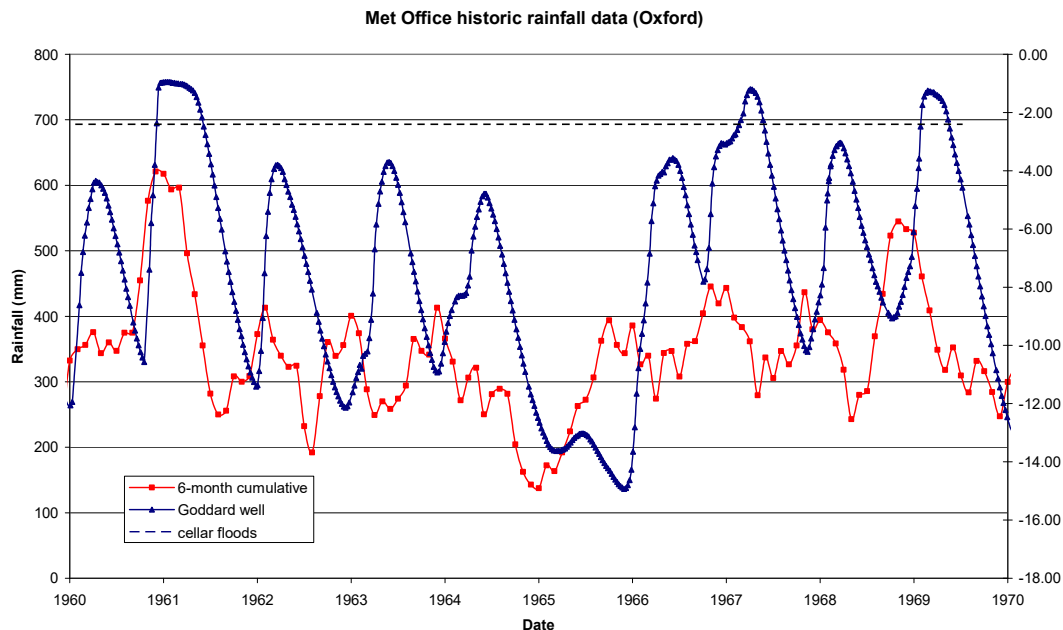
### East Ilsley floods – can we predict the next one?

By Dr. Sue Burnay

The lower part of the village will often flood during wet winters when the water table rises to a level where the Pang stream is above ground. If the water level is high enough then water comes into basements and has to be pumped out. At the same time a series of ponds appear in the fields alongside Abingdon Lane and down towards Compton.

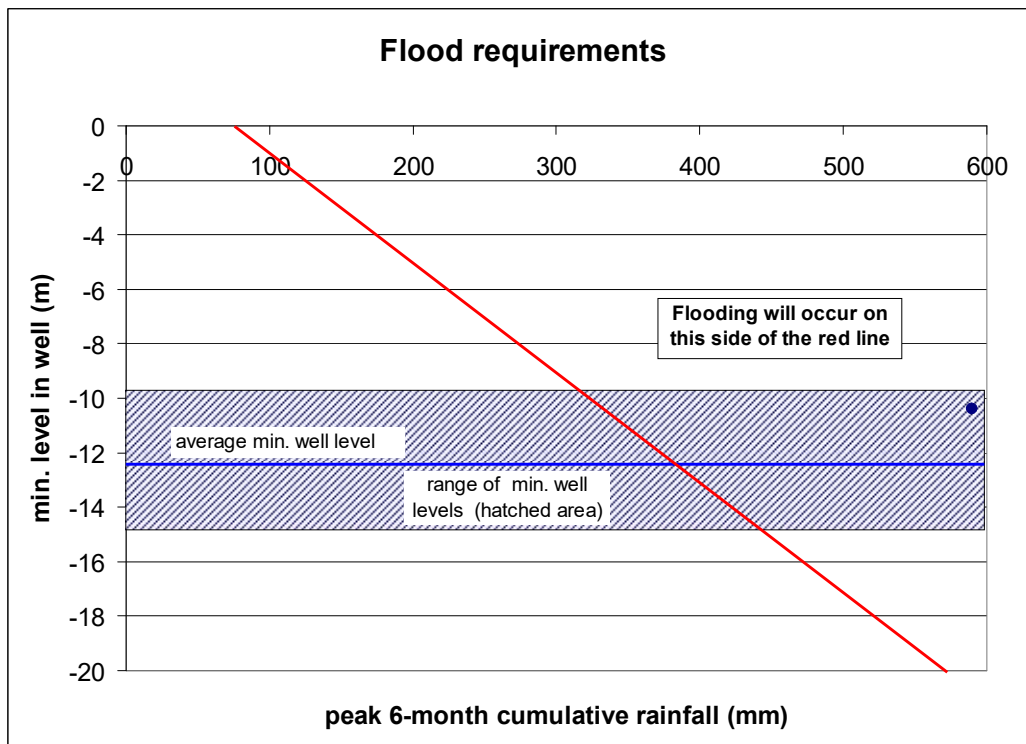
This winter has seen exceptional rain and the floods have been the worst for many decades. So is there any way we can predict when the next flood will come, before it becomes obvious from water entering basements and ponds appearing in the fields? There must be a link to the amount of rain that falls but how much rain is needed to trigger the floods?

We are fortunate that the late Marcus Goddard kept meticulous records of the water levels in his well from 1923 until 1997 and noted the level at which his basement started to flood. These levels can be compared with historic data from the Met Office records of rainfall. The nearest weather station for these records is Oxford so the rainfall data will not exactly match the rain that fell in the area around East Ilsley, but it should give a reasonable indication. Water moves slowly through the fine pores in the chalk layer that lies under the Pang valley, so it is necessary to estimate the time scale needed for the rainfall to be reflected in the water levels in wells and boreholes. Comparing the Oxford rainfall data with Marcus Goddard's well readings, it looks as though the best indicator is the cumulative amount of rain that falls in the previous 6 months. An example is shown below for the period 1960 to 1970. This period has been selected because the floods of 1961 were exceptionally bad and 1965 was a drought year, so it shows some of the extremes. The well readings tend to peak in the late winter/early spring and drop to a minimum in late summer/early autumn.



*Comparison of 6 month cumulative rainfall with well readings*

If the 6 month rainfall is greater than about 450 mm then it looks as though flooding occurs, but this is not consistent enough to use for prediction. The other vital factor is how low the water level drops in the previous summer. Taking all of the data for the period 1923 to 1997 and comparing the minimum well levels with the 6 month rainfall at the peak well level, a better estimate can be made of the conditions required to get flooding. This is summarised in the graph below. The average minimum well level is shown by the blue line and the rainfall required for flooding to occur is shown by the red line – the further to the right of the red line, the worse the flooding.



*Rainfall and water level limits required to trigger flooding (historic data 1923-1997)*

In most years, rainfall of at least 380mm was needed before flooding occurred but it could occur with as little as 300mm if the previous summer was very wet so that the water levels had not dropped back. The very bad floods in 1961 (blue circle in the plot above) occurred when the rainfall to Jan 1961 was about 600 mm and the minimum well level the previous summer was -10 m, so it's not surprising that it was a massive flood. To put things into context, the average rainfall for the 6 months to January was usually around 400 mm but could vary enormously, as low as 180 mm and as high as 600 mm.

So where do we go from here? Readings are not now available from the well used for earlier measurements, but we do get regular updates of the readings from the Environment Agency's borehole at Hodcott in West Ilsley. Once these borehole readings can be correlated with the levels required to trigger flooding in East Ilsley, we may have a valuable predictive tool. It will be necessary to make a note of the minimum level in the summer and then track

the cumulative rainfall as winter approaches. Daily rainfall data is available on-line from the weather station at Benson, so it ought to be straight forward to track this but there appears to be a discrepancy between the cumulative data from the Met Office and that reported on-line from Benson. This will need to be sorted out before we have a practical tool. We cannot stop the flooding but we hope to be able to give residents early warning of the probability of flooding occurring in the future.

Maybe history can be useful!