

The erosive effect of hard groins seen on the River Lune and River Kent

The River Gauge at Caton on the River Lune recorded the highest ever flow on an English river as 1742 (m³/second) – That's 1742 tonnes of water flowing down the river every second! The flow peak was recorded at 00:15 on 6th December 2015 following the intense sustained rainfall from Storm Desmond.

The following photos show the effects of the groins on these rivers and acts as a warning to avoid using hard engineering works like these in the future.

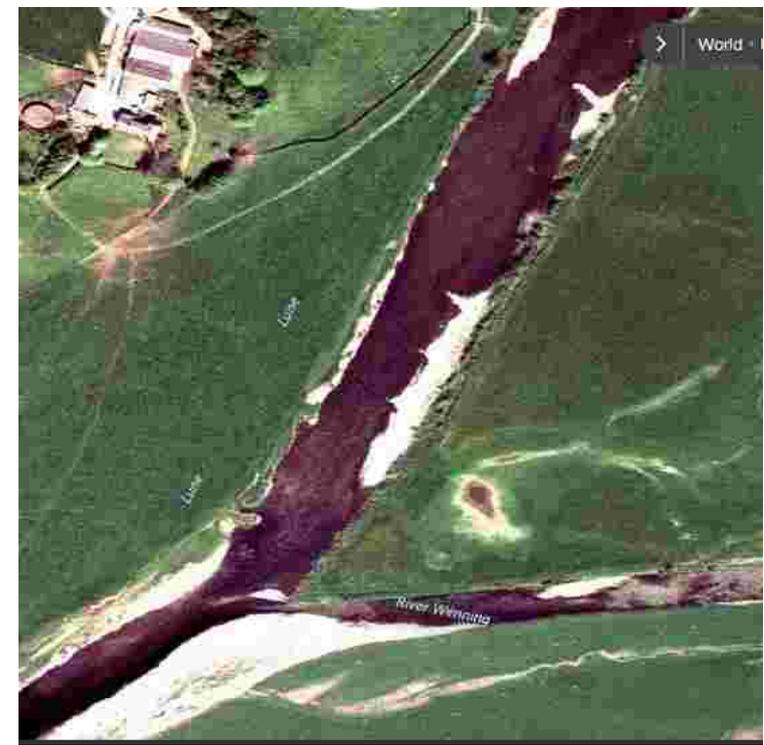




Three twin upstream groins above Kirkby Lonsdale on River Lune.
These slope down into the river and are made from rough limestone blocks piled from the bank. The bank in this area is fairly intact compared to other areas on the river. The river is about 5 metres deep below the groin.



Priory Farm Hornby on the river Lune. Upstream groins on inner bank on slight Corner. Some gravel collection shown on aerial photo. After flood Desmond the gravel has gone. The groin extension along the bank has collected gravel behind it. Slight bank erosion around groins. More damage on opposite bank downstream. The groins may have contributed to this erosion by narrowing the river and speeding up the flow on the opposite bank.

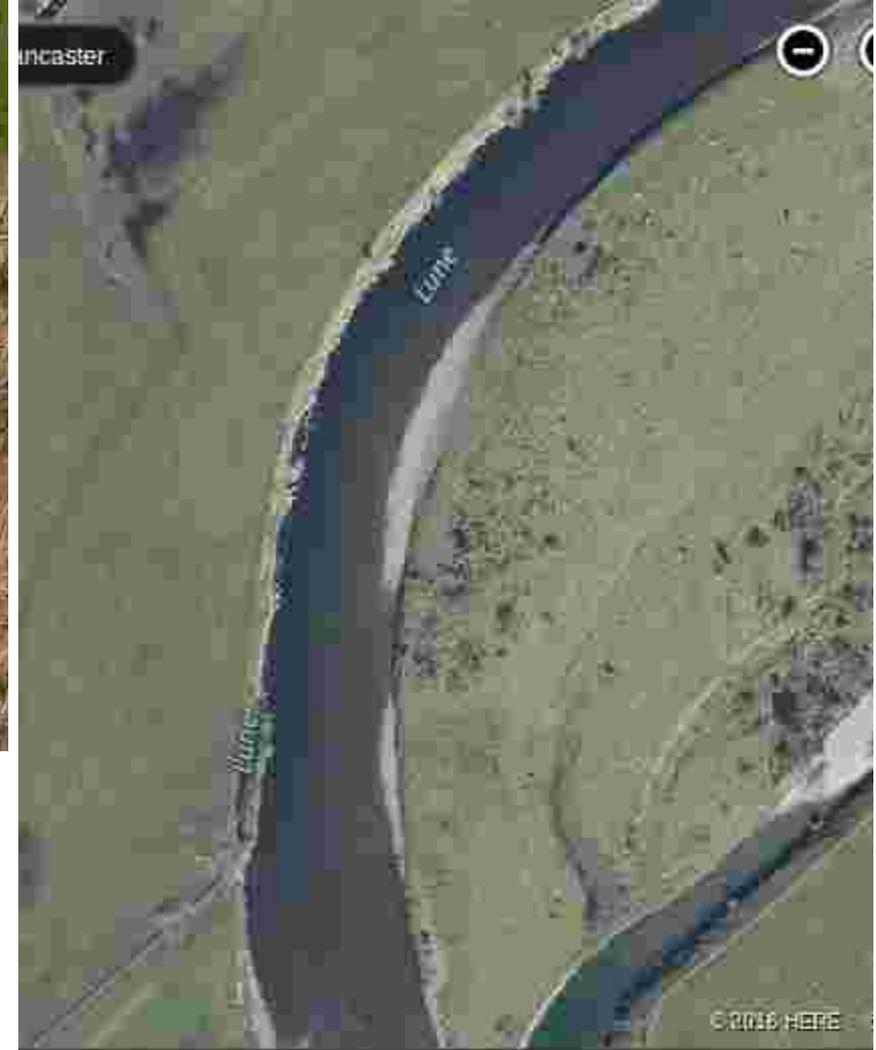


The aerial shows old groins filled with gravel on East bank. This is now growing Willows. - not eroded in flood.

The West bank opposite Priory Farm Hornby on River Lune shows extensive erosion after rocks. These may be the previous groins. The erosion may be exacerbated by the narrower river making the flow faster,



Massive erosion on River Lune below Newton caused by rocks that were supposed to protect the river bank. The aerial shows the rocks had previously been exposed by the water back-cutting behind them (along the left bank). During the Flood Desmond storm the river flow would have been pulled into the bank through the rocks eroding behind them. In the order of 20,000 cubic metres of soil have been lost from this area.





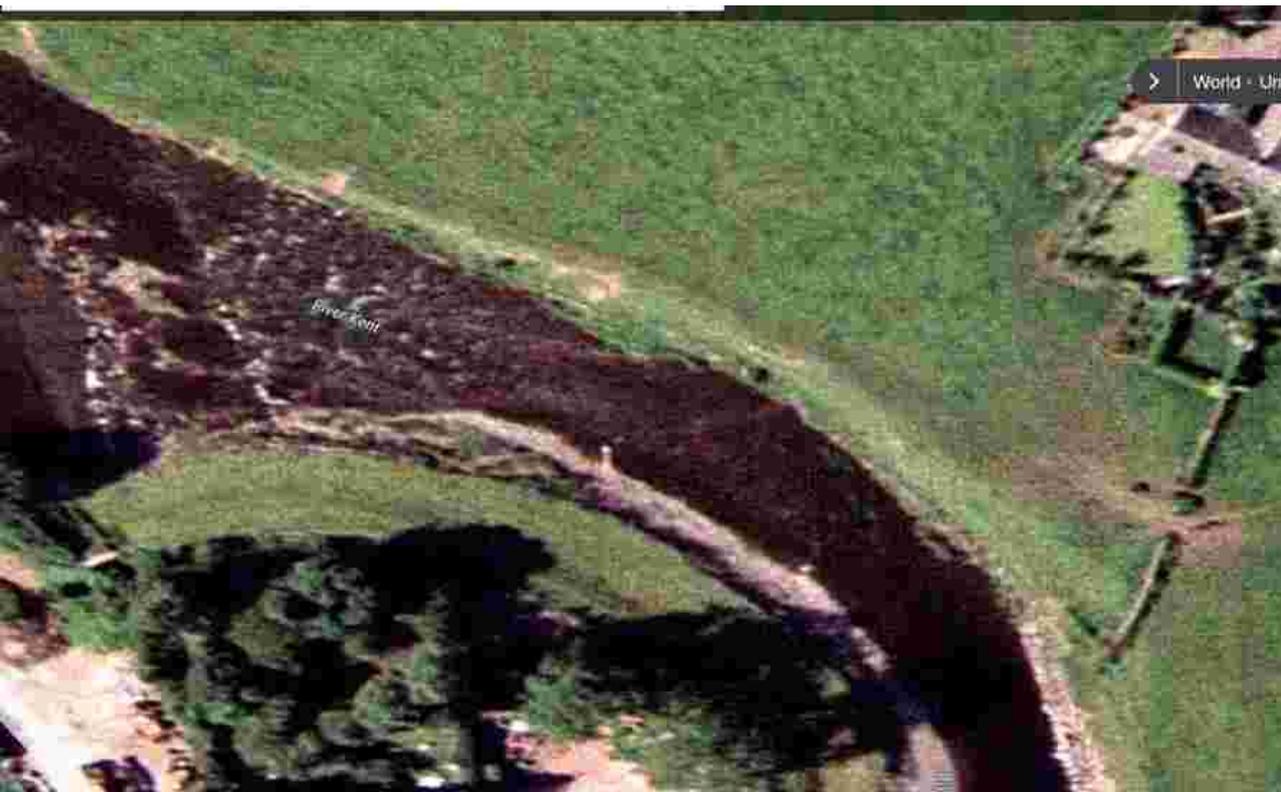
River Kent just South of Kendal. Massive erosion caused by bank armoring with rocks. The flood water has been pulled through the gaps in the rocks and eroded behind them. The triangular groin has gone and may have contributed to the erosion. The old river bed is now filled with gravel

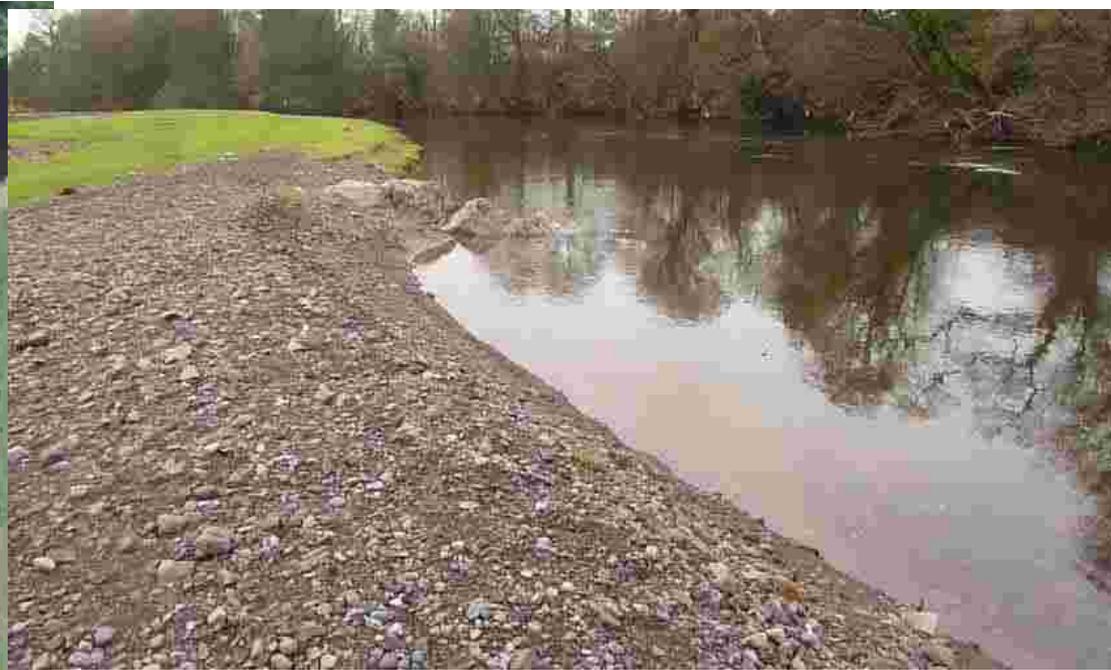


Triangular groins below Kendal on River Kent. The bank has eroded badly but just at the point of these groins there is a projecting bank. Erosion occurred on both sides.

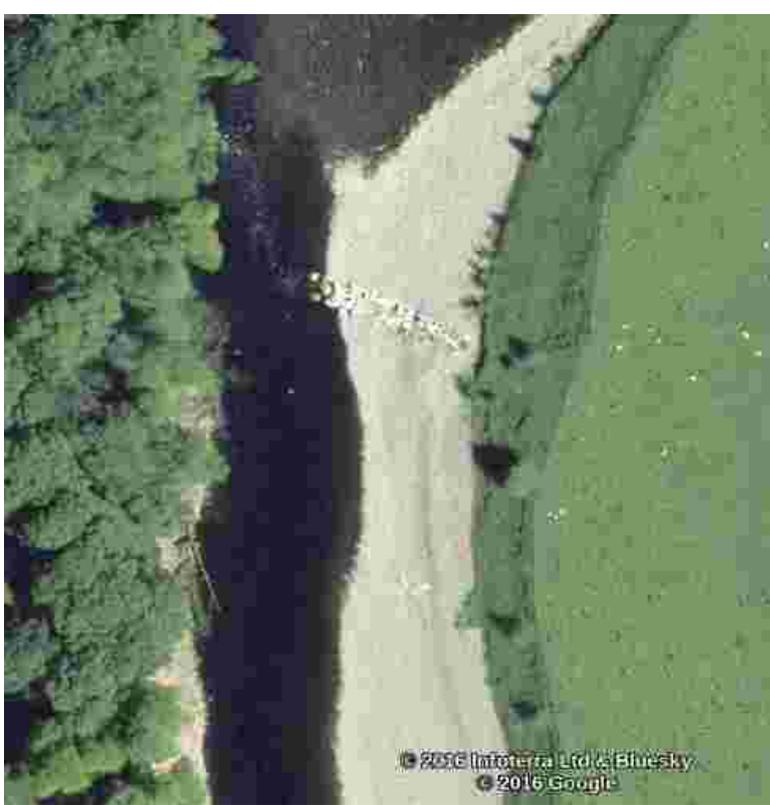


Bank erosion below weir South of Kendal on river Kent. The erosion is on the South bank which had groins and 2 layers of armoured rock along the bank. It looks as though the rock armouring has collapsed at the end of the wall and this has pulled the flow to the bank. There is no sign of the old groins. Were they washed away in the flood or removed earlier?





Small upstream vane of a single line of rocks (A micro groin) has collected a massive amount of gravel behind it. Note the gravel curve as it flows through the rocks. On River Kent just South of Kendal downstream from a large stretch of eroded bank.



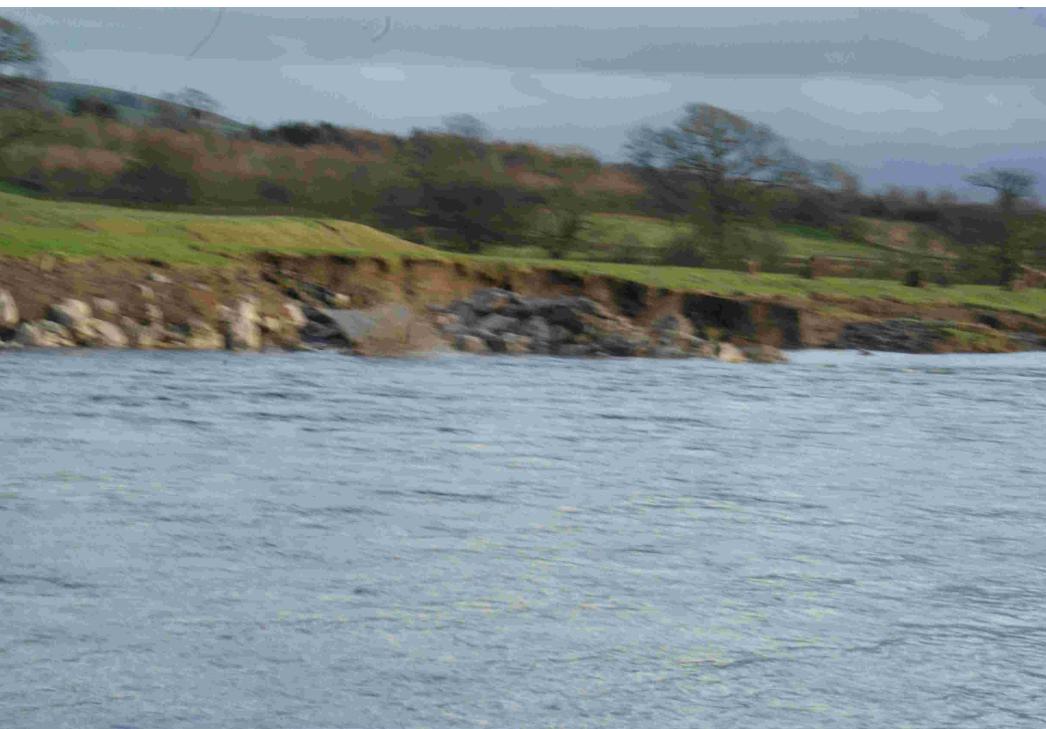
Steep wooded bank undercut and landslip. This is opposite the groin shown on aerial. The groin had built up a gravel bed either side reducing the width of the river and pushing the flow under the bank. River Lune below Mansergh Hall.



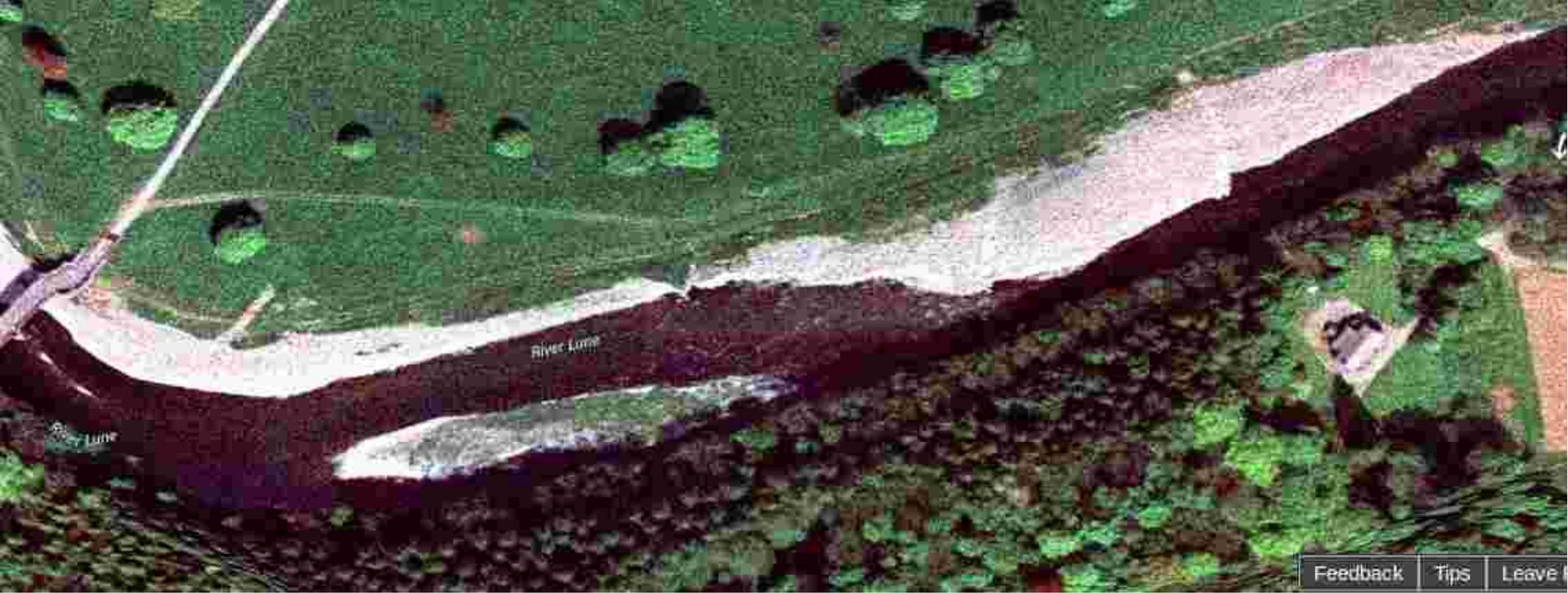


Groins near Nether Burrow along the west bank all failed and bank eroded. The hard groins look like they have pulled the water in below them and washed away the bank.

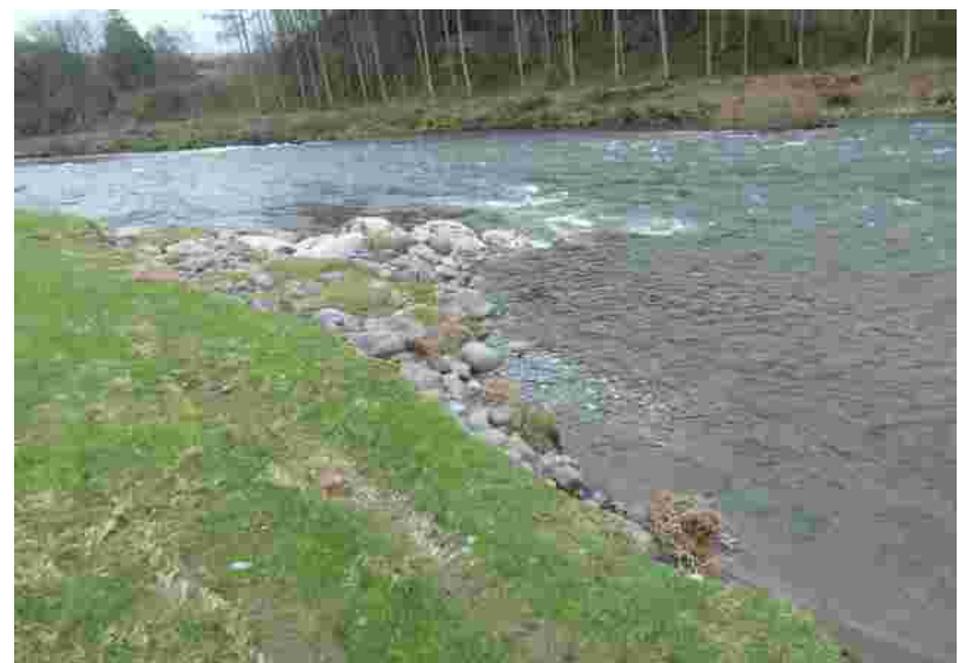
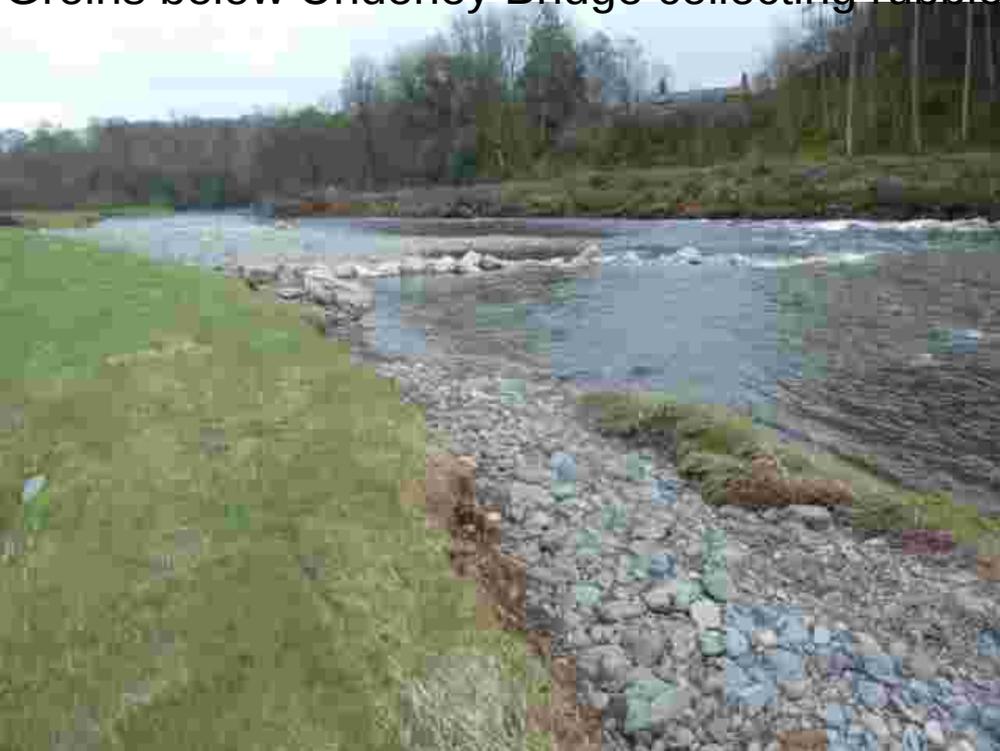




Groins and ford near Fleshfield Farm on River Lune. All groins washed away and bank badly damaged. It looks as though the groins crossed most of the river and would have Restricted the flow and speeded up the flow In the centre of the river. If there is a deep river bed here the current may have undercut the Bank.



Groins below Underley Bridge collecting rubble. The top groin was damaged before Flood. R. Lune
A big collection of gravel





Above Underley Bridge on River Lune. The wooded bank has collapsed in Storm Desmond. It looks as though the water pressure may have backed up while going under the bridge. This could have caused the undercut.



The Low Bentham to Wennington Road has been undercut by the River Wenning. This is on the third eroded bend on the river below the railway bridge. It looks as though the hard vertical rock armoured bank under the bridge has speeded up the river in Storm Desmond. There are some underwater rocks on the first corner that may have contributed to the bank erosion, but it is more likely that the river got into a swing that finally lost its force just after undercutting the road



Conclusions

The evidence from these photos show the extreme erosion that can occur with peak flood conditions around hard groins and rock armouring of the river bank.

The only really positive action is with the small six rock groin (a micro-groin) on the River Kent that accumulated rocks and gravel above it along the bank.

These help to protect the bank.

Hard groins and hard banks create erosion

Gentle micro groins and soft protection like willows and alders
Protect the bank.

Rod Everett Feb 2016

All photos by river Rod Everett. Aerial photos from Bing maps or Google Earth