Dealing with extreme weather – Greenhouse Thinktank
River Roeburn Remembering Restoring
28 October 2017 Friends Meeting House, Lancaster
Presentation by Rod Everett, Backsbottom Farm
Roeburndale, Lancaster
Rod has lived next to the River Roeburn since 1957

Dry desert gully erosion – Jordan
Wet desert gully erosion Roeburndale
UK
Current landslips just below Mallowdale Pike on land where blanket bog was damaged by fire 1947. Note that this is grassland rather than blanket bog with heather and sphagnum mosses. The grassland is more palatable to the sheep and is grazed hard. In this condition it doesn't hold any water and has a fast run-off.

Left. Landslip after Wray Flood 1967
Colros Beck
deep gully
erosion just
below
Mallowdale Pike
Warm beck gully erosion running South off Whitmoor. Aerial photo shows bare area 1965
Active landslip from Roeburndale Woods
This started with around 700 trees
Washed away in 1967 Flood.

This is still eroding 50 years later as it is undercut by river.
Small drainage channel caused massive landslip in Flood Desmond with 20 mature larch trees.
Eroding peat areas on Goodber Common. The acidity from the peat in the river contributes to the River Roeburn acidity. Ph 3.4 has been measured which will kill most of the aquatic insects in the river. The peat additionally locks up some of the oxygen in the water which makes it more difficult for the fish.
Barkin Bridge after Wray Flood 1967. Note the large mass of trees built up against its buttress.
Backsbottom Farmhouse washed away 8 Aug 1967. Bill and Alice Brown were rescued from the bedroom above the kitchen. It was a 5 bedroom farmhouse with hay barn and shippon attached. In the yard there were other buildings such as machinery sheds and hen house. The bridge next to the house and the sheep pens including lambs went as well. Lost 1 pig, 1 heifer, 45-50 lambs and a sheep dog. “The river just boil over the garden – like milk boiling in a pan.”
8 August 1967 Wray Flood 13 houses and 7 bridges were lost. The water level was 8 ft above the bridge.
Wray near the bridge after 1967 flood.

Wray village near bridge before the flood.
Trees brought down the river by Wray Flood 1967
Looking towards Bridge End and below Wray.
Rainfall in Roeburndale
From 1/1/61 – 31/12/2015
210 records of torrential rainfall over 32mm

Flood Desmond 100mm in 24 hours.
River Hindburn at Wray 2.94 m deep.

Wray Flood 8/8/67 117mm in 90 mins with an extreme downfall for around 10 mins at Higher Salter. River Hindburn at Wray 4.91 m deep.

Roeburn Flood 2/9/1892 River rose 3 m in 3 hours. Washed away Backsbottom road. Local farmers have memories of large floods that would keep the river close to bank-full for a week. Now the River rises and falls within a few hours.
Wray river levels for the Hindburn and Roeburn showing major flood levels over 2.3 metres high. Black line shows average high 0.9m. Full records from 1970 with missing dates 1981-1990. Wray Flood level height due to trees backing water by Mealbank Bridge.

One extreme flood on average every 2 years
5 in last 2 years
River levels on Hindburn at Wray 6-13 Oct 2017
Peak flow 2.3 m. Flood Desmond 5/12/2015 peak 2.9m

11/10/17

12/10/17
RIVER ROEBURN
Is this the heritage we want to leave our children and grandchildren?
River Festival – engaging with the local community  Music, Arts, Slow the flow displays
Blanket Bog Restoration
Before
Grip Blocking
Check Dams
Woody Debris dams
Swales on contour
Contour Tree Planting
And Contour hedges
Grazing Management
Mob Grazing
Improving Living
Soil Structure
Healthy soil biology

In River training
Rocks in rivers
Attenuation water
Storage areas
Putting back
Meanders in water
Courses
Tree planting
Keyline Subsoiling
Increasing Organic
Matter

Natural Flood Management
aims to slow the flow.
Small actions throughout
a catchment make a difference.

Diagram:
- Inflow / Non Attenuated Outflow
- Flood
- Target discharge rate
- Attenuated Outflow

Flow rate vs Time
Leaky check dams help to slow the flow.

Part of a demonstration area showing different techniques of Natural Flood Management.
A contour swale with trees on the down hill side helping to absorb the water
In River Training – This is horseshoe shape of large rocks that pulls the water into its Centre – making the river deeper away from the banks. Rock river sculpture from the festival.
Mob grazing moving livestock to new ground every 24 hours helps build a soil structure that holds and absorbs water and creates a rich soil biology.

Restoring blanket bog with sphagnum mosses absorbs water and by its roughness slows the flow. It also cools the ground reducing the water temperature. This increases the water density and helps it sink into the deeper ground water.
Building a healthy living soil structure with high Organic Matter helps reduce floods by:

- Stopping run-off by increasing infiltration.
- Holding water.
- Retaining nutrients.
- Increasing plant rooting depth.

1 kilo of C in the soil holds around 1 litre water
1% increase in OM/ha holds around 22 cubic M of water.

The Soil Food Web – Elaine Ingham

75000 species of bacteria

The Soil Food Web
Keyline Subsoiling helps to spread water over the whole field and sink into the ground.

The images show a keyline plough being used and a cross section of what the plough does under the surface. The plough is not used to turn the soil over, but it opens up the soil allowing air and plant roots to penetrate deeper into compacted soil. As can be seen in the second diagram this brings dramatic improvements to the growth of the sward which then opens up the soil further and improves drainage. The plough is used to improve water retention on the land by ploughing slightly off contour when going on to a ridge to drain water up a ridge not down into a valley.

For more details see http://tcpermaculture.com/site/2015/05/04/an-introduction-to-keyline/

The goal with Keyline is to try to evenly disperse water over the landscape. This means changing the tendency of water to move from ridge to valley, and instead have it move from valley to ridge.
Making a film with Mark Minard and Bryony Rodgers  River Roeburn – Remembering Restoring
River Roeburn Remembering Restoring
Rod Everett

www.riverroeburn.uk

Film due November 2017

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