Rod Everett April 2015

RIVER AND WATER CATCHMENT RESTORATION

Water in rivers is, if you like, a gift which the community higher in the watershed hands down to the communities lower on the river.
The society which acts as the bearer of such a gift should not try to plunder it, but should pass it down in a fit and cared-for state.
M.Kravcik

Actions

To divert and catch the excess flash flood water to hold it in the landscape. This will allow The water to infiltrate into the underground aquifers and be available to feed the deep spring cycle.

This is water that only appears with heavy rain

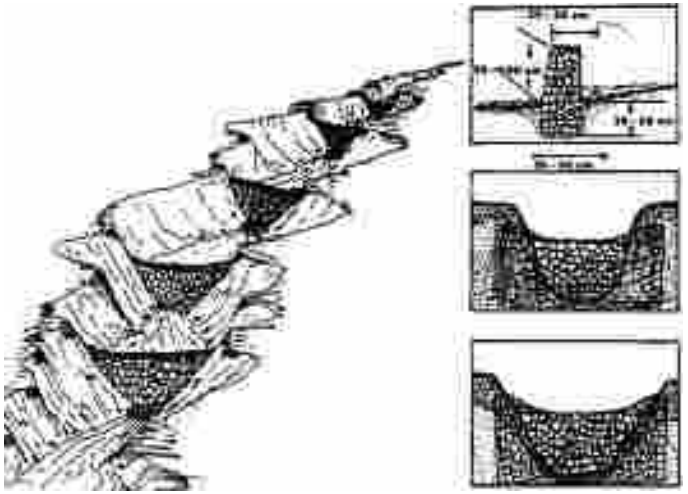
Ponds holding water

New ponds or other water retention features hold water in the landscape and provide Valuable wildlife habitat.

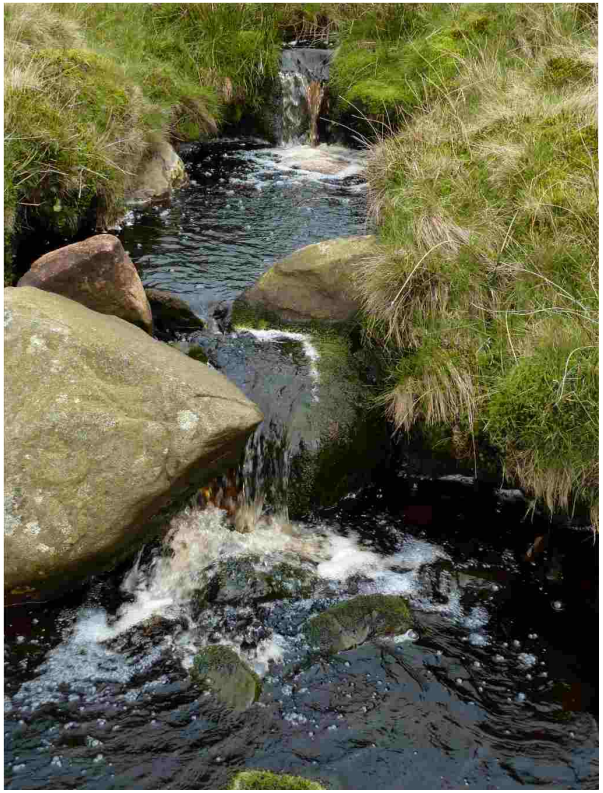
Create contour swales(ditches that follow the contour) that hold water In the landscape and help it infiltrate.

Trees planted along the contour help to Take the water deep into the ground. The Pontbren project found 65x more infiltration with Contour tree planting compared to grazed land

Action
To slow down water flow in deep gully bottoms with check dams.
Check dams are stable leaky dams.



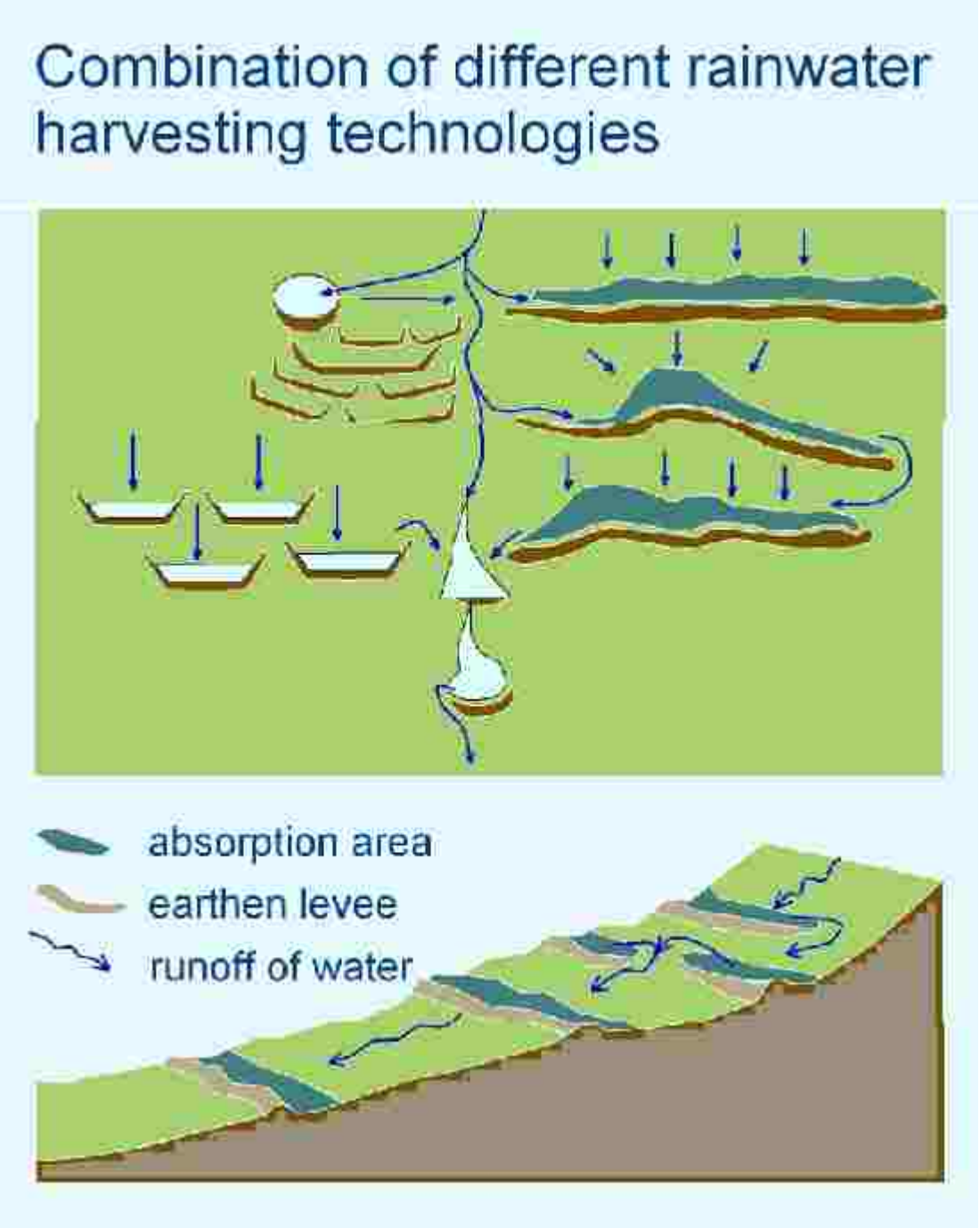
Natural check dam



Action ;
To stabilise vegetation in the highest catchment areas to slow the run off of storm water.
Encouraging the development of blanket bog with dwarf shrubs such as heather, cross leaved heath, bilberry and cranberry, and sphagnum species.

Action
Some high eroding areas could benefit from woodland planting to hold the soil
Cool rain water and infiltrate water.

Diagram from “water for the recovery of the climate” – M.Kravcik et al



Contour swales and ponds away from the main stream can be created to catch excess flood water. Some of this water will Infiltrate into the ground water and some will be released slowly back into the main stream.

These actions will have multiple benefits, whose impact will only become evident when we step back and see The larger picture they contribute to.

It is up to us to make sure our rivers survive and thrive. Water is our most precious resource and it needs its own space. Otherwise our source of life might just disappear. Otmar Grober.

If we focus on each separate activity, It is easy to dismiss it by thinking “That won't do much”. To see the power of a step, we need to ask “ What is it part of?”
An action might seem inconsequential by itself. It adds to and interacts with other actions in ways that contribute to a much bigger picture of change.
J.Macy and C.Johnstone

The following section highlights the multiple benefits for the local Community from River and water catchment restoration.

Benefits from River and water catchment Restoration

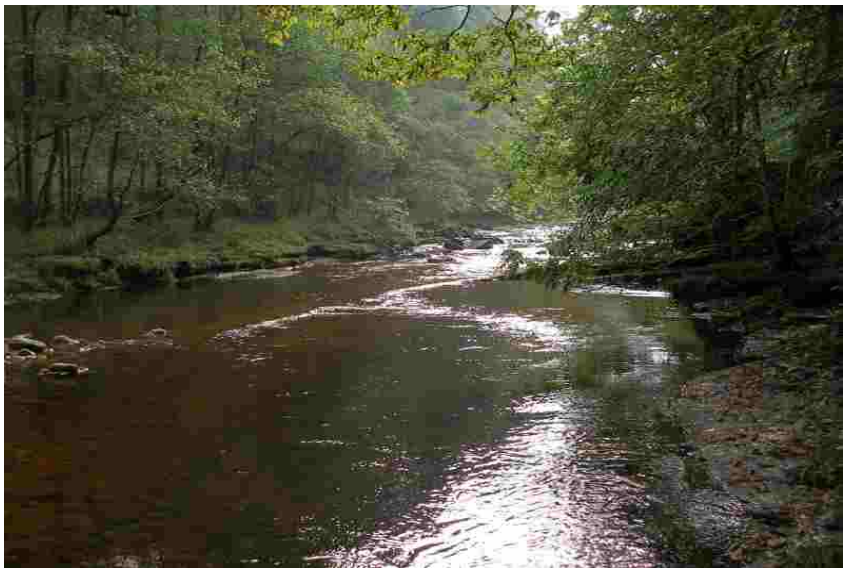
Slower run off

Aquifers refilled

Reduced erosion

Increased potential For water based energy

Reduced sediment Loss and discoloration



Reduced likelihood of peat fires

Fish numbers And diversity increased

Increase In wildlife

Reduced Pollution Down river And on beaches

Natural Springs restored

Fishing viable

Climate and Weather moderated

Education

Minimise Flood damage To Property

Livestock marketing

Benefit 1 **Reduced erosion**
Reduced erosion down river. Landslips and undercutting of banks should be reduced
This will benefit farmers down stream who are losing soil.
“A farmers wealth is in the soil. Don't lose it”.

Benefit 2 **Reduced sediment**
Reduced water discolouration and sediment loss from the upper catchment
and the river banks further downstream. Included in these sediments are valuable
soil nutrients. These sediments use up oxygen in the river making it less able to clean
any pollution reducing the rivers ability to support a rich aquatic life.

Benefit 3 **Slower run-off**
By protecting the ground surface and re-vegetating the land the water run-off is slower.
Bare ground heats up and dries out. In a warm dry condition it throws water off without it
sinking in. This is similar to water rushing off a hot stove surface.

Benefit 4 **Refilled aquifers**
By holding the water longer in the landscape it gives it more chance of infiltrating into the
underground aquifers and into the soil structure. (The underground and soil water is
hundreds of times larger than the water visible in lakes and rivers). This water is important
for growing grass and the deeper water provides water for springs and boreholes.

“It is also paradoxical that soil partially saturated with water is capable
of better absorbing more water than dried out soil. If precipitation falls
on compacted and dried out soil, infiltration to deeper layers occurs only
after a period of ten minutes or more. In the first minutes, however, the soil behaves like
an impermeable surface. During extreme rains, there is a rapid runoff and concentration
of rainwater to river beds. This same rainfall--- would be easily absorbed in land
healthily saturated with water.” Kravcik.

Benefit 5 **Spring water**
Once the spring water is flowing regularly then small streams will not dry out.
In recent years some side streams that have never been dry, have in recent years been empty of water for weeks. When this happens all the aquatic life dies. It may also remove areas important for fish spawning.
These springs are important for grazing livestock as they provide mineral rich water.
Recent boreholes have been getting deeper indicating the depletion of our valuable underground water resources.

Benefit 6 **More diverse fish, larger numbers and size**
With a more stable water flow and less scouring of the river by flash floods, the successfu
spawning of brown and sea trout should improve. Leading eventually to restored fish stocks similar to those in the 1920,s.

Benefit 7 **Viable fishing**
Once the fish have returned then fishing would become a viable activity. This would give potential added income for farmers and landowners down the river.

Benefit 8 **Potential livestock marketing**
Restoring the river catchment will give opportunities for livestock marketing.

In Wales the Pontbren farmers group (a group of 10 neighbouring small farms located in the heart of the Welsh countryside) have restored their water catchment to bring otters back and have developed a marketing group based on their highest possible standards of environmental management, particularly around water management and slowing water runn off.

Benefit 9 **Reduced Pollution**

Reduced pollution down river and onto the beaches around Morecambe Bay.
With flash floods, animal manures are picked up from the land and washed into the river.
In Flash floods, the river water flow has horizontal rolling flow instead of the normal Longitudinal vortex flow down the river. With the horizontal rolling flow the manure does not get cleaned as it moves down the river and causes pollution problems (This is one of the prime reasons for setting up the Lower Lune Catchment Sensitive Area).
With a steady river flow and longitudinal vortices, the light harmful anaerobic bacteria get thrown to the outer edge of the vortex where they are killed by high levels of oxygen. Within a few hundred yards the river can be cleaned.

Longitudinal flow- Cleaning

Horizontal rolling flow
Polluting

Benefit 10 **Increase in Biodiversity.**
A steady flow of water in the river would benefit wildlife.
Birds like dippers would increase with less acid input from the peat.
Dragon flies and amphibians like newts, would make use of any water held in the landscape.
Otters would return with increased fish stocks.
The steady flow would enable the fresh water limpet to re establish in the side streams.

Benefit 11 **Increased habitat for game cover and natural game feed.**
Planting trees, encouraging heather regeneration and wetland creation
Make ideal game habitat.

Benefit 12 **Reduced risk of peat fires**
More water in the soil and more moisture in the blanket bog will help to reduce the Risk of fires in very dry conditions. Fires that remove the top vegetation and get into the peat are very damaging to the long term stability of the upper catchment area. A fire in the 1940's is likely to have been the destabilising factor on Mallowdale Pike that Led to the flood disaster in 1967 down the valley.

Benefit 13 **Reduced flood damage to buildings and highways**
Reduced risk of flood damage down river. This damage can be to buildings – such as the Wray Flood, or to highways with flooding and undercutting roads

Benefit 14 **More stable potential for water power**
Increased potential for water power and water use further down the river.

Benefit 15 **Education**
Understanding how to honour and love your river will be very important in education of our younger generation.

Potential wider benefit of **Climate moderation.**
M Kravick argues that this form of river restoration is vital for climate moderation. He has instigated similar work throughout Slovakia.
The upper catchment will hold more water. This will enable evaporation into the atmosphere in warm conditions. This has a moderating effect on temperature and weather and will protect the ground from overheating.
“a surface with no ability to evaporate water creates not only favorable conditions for the origin of extreme weather, but also exacerbates the effects of such weather.”

The weather effects will be both, local and towards the drier east side of the country.
In addition a reduction in the loss of peat reduces the release of CO2 and methane. These gases contribute to contribute to global warming.

“The draining of the land is like living on debts. Water falling from the large water cycle is like a state subsidy. It comes for free but not regularly, often to wrong recipients and in the wrong amounts. It sometimes brings more harm than good. To rely on it is risky because today it is here, but tomorrow it may not be.”

Draining does not specifically relate to farmers drainage of fields it is more that the whole catchment is losing water by fast run off. It isn't being held in the landscape, underground aquifers or the vegetation. Thus overall the catchment is depleting the amount of water over time. Reinstating the short water cycle where local evaporation helps to protect the land is important for our future.
For full details see M. Kravcik Water for the recovery of the climate – a new water paradigm. Available on the internet.