

Friday 9th November 2007

Westcountry Rivers Trust & Association of Rivers Trusts Autumn Conference

“The myth of the natural river: to protect, restore or enhance?”

Mark Davis and Lesley Williams recently represented SOCS at the ART autumn conference held at the Eden Project, Cornwall. Members of the two joint host Trusts were delighted to see us, SOCS having become a member of ART earlier in 2007.

The conference provided an important opportunity for making useful contacts with members of other rivers trusts, and discussing different ways of approaching common problems within the river catchments. Additionally speakers from varying backgrounds provoked interesting discussions under a general theme of making room for water - have you ever considered the vital role beavers can play in flood alleviation? There was a suggestion that they are the past masters at water management, and we have a lot to learn from them. A brief synopsis of the talks follows.

Malcolm Newson, Newcastle University

This talk was about how current river restoration is trying to ‘undo’ the effects that man’s actions have had on the natural state of rivers over the last few centuries, and questioned whether we are necessarily doing the right thing for the right reason. In Australasia, the sudden influx of settlers had a dramatic impact on rivers - the effects becoming apparent in a comparatively short space of time. ‘Settler guilt’ has therefore shaped river management philosophy in those countries for many years.

In the UK man’s effect on the rivers was much more gradual, the main signals of river changes to date have been largely as a result of climatic changes rather than from man’s influence. It is thought that the UK rivers are only now showing the effects of changes arising from man’s actions from 100-200 years ago - we are therefore ‘out of step’ with the signals. When making an assessment of how far a river has changed from its natural state, there is a tendency to place a large emphasis on aesthetic changes, rather than chemical or biological measurements. Current ‘restoration mania’ may reflect an act of public contrition for the damage done by man during the agricultural and industrial revolutions. Use of the word ‘mania’ is not necessarily negative - if it is defined as ‘the justifiable enthusiasm of local restorers and rehabilitators with good design advice and provable economic benefits’ then it becomes a much more desirable trait. It is important that reference conditions used for restoration should reflect the natural state of that river. In other words care must be taken not to ‘fake nature’ by adding gravel, deflectors etc if that was not the natural state of that river at a time in the past when there was low pressure from industrialisation.

However, you cannot consider the river in isolation from its catchment. If a river is returned to its truly natural state this could result in flooding if the catchment no longer has resilience to such effects. Choosing to leave the catchment to flood could be

unpopular in socio-economic terms. Evidence based regulation of the environment requires standards and targets despite the inherent uncertainty. Managing catchment impacts are vital if climatic changes are not to re-set nature.

Finally we were left with the chilling thought that if the Water Framework Directive is not fulfilled in its entirety, then all the hard work that is being done alongside it will be in vain.

Edward Maltby, Liverpool University

People play a key part in catchment management. You cannot influence actual changes in the soil and natural river processes, but you can influence what people do and how that affects the river. Human wellbeing must be a key focus in the social context of how we use and manage water. Scientific data is required to link the ecological realm with the socio-economic realm.

The general public need to know what's in it for them i.e. they need to see and understand the benefits of river catchment management. There therefore needs to be a linkage with human wellbeing outcomes.

Restoration and conservation priorities will be affected by the different levels at which they are considered. At catchment level they will be determined by stakeholders, but at country level they are political and will have international drivers.

One desirable endpoint of restoration may be re-connecting a river with its flood plains. Re-connecting with the flood plain (retrieval from agricultural use) may conflict with the requirement for agricultural land to produce foodstuffs. Taking an ecosystem approach to this involves considering the 3 overlapping but sometimes conflicting aspects of Biodiversity, Equitable Use, and Sustainability. This underlines the importance of a link between nature and society, and directly maps to the Water Framework Directive.

We were then informed about a project being undertaken in the South East of England - 'Sustainable River Catchments in the South East' (SuRCaSE). For more information on this project <http://www.liv.ac.uk/swimmer/surcase/index.html>

Gijs Kurstjens, Gelderspoort Project

In the last 100years, Holland lost 50% of the land area devoted to nature reserves to a low in 1990. The government then took a decision to actively increase the area of land for the benefit of nature, which involved purchasing land and returning it to nature. The situation at the time was of fragmented nature reserves, so the focus was on providing nature corridors between these reserves - these corridors were both 'wet and dry'. An area was identified on the River Rhine in Holland - at Geldersepoort - which is at the top of the delta. The area is populated by 0.5million people so is not rural. Dykes already restrict the natural flood plain, the project was within the remaining flood plain which needed to be re-claimed from agricultural use.

The Rhine between Rotterdam and Germany is the busiest navigation channel in Europe. There is a major problem with silting up of the river channel which increases flood risk. Flooding is an important process, but also carries risks. A change in mindset was required not to build higher and higher dykes, but instead to provide space for flood water. This led to a water management project from the Dutch government, the title of which

literally translates as 'space for the river'. The budget of €200m came from the government in partnership.

The main channel is still used for navigation, side channels were created for nature. Filter feeders (the base of the food chain) were introduced which resulted in improved water quality. Within a short space of time there was a dramatic increase in the birds and plants, including ones from the red book. Other key species were re-introduced (beaver in 1994) which have become a tourist attraction in the winter. Grazing herds of horses are important for keeping vegetation in check - these are essentially wild and live there all year round. Green tourism has increased providing economic benefits to the local areas. Future plans are to export the concepts adopted across Holland. Particular plans are to re-connect these areas with higher dry ground providing a North-South corridor, and also the re-introduction of red deer.

Ronald Campbell, Tweed Foundation

Fisheries management - where does it fit? It lies somewhere between the freshwater environment and the tourism/ leisure industry. It includes the catchment, rivers, fish, anglers, and fisheries managers. A key role of fisheries management is providing information to people in agriculture, forestry, industry, road building, urbanisation etc.

Within the forestry commission in Scotland joint production of forests and water guidelines revolutionised the forestry plantation designs. Prior to this joint working forestry production culverts caused severe problems for migratory fish. The important lesson from this is about providing information to people making decisions. There are still problems with e.g. run off, but the situation is infinitely better than it was a generation ago.

When making planning (& spending) decisions it is important to distinguish between short term problems and long term trends. i.e. fish numbers do not just depend on the number of fish spawning but also on the proportion of juveniles that survive - it is therefore vital to obtain details on numbers at all stages of the life-cycle before deciding what if any work needs to be carried out. Good habitat is required for good fish stocks, but poor fish stocks does not necessarily indicate poor river quality. The problem could be over-fishing, or pollution in the estuary may be killing fish before they arrive at the upstream areas to spawn. Even if there is no problem, work is ongoing just to maintain the current situation.

Fish do not need management - people do. It is people that over-fish, cause blockages, pollute the water, introduce alien species etc. It is vital that information is provided to the policy deciders to control these problems.

In Northumberland on the Tyne, between 1960 and 2000 there was a massive effort put into re-stocking of salmon (but not sea trout). Latest catch rate figures show no difference between the numbers of salmon being caught and those for sea trout. These figures clearly show that the increase in numbers was attributable to a corresponding increase in water quality during this time and had absolutely nothing to do with the re-stocking!

Alistair Maltby, ART

Although it seems an unlikely comparison, the rivers in the Pacific North West lie on a similar latitude to the UK, have similar types of river, similar historic ecology, the stream

morphology is similar, and the anthropogenic impact has occurred within the last 150 years. By studying these rivers we can understand the history of our own rivers.

The main industry of logging has had a devastating effect on the rivers. The problems are due to straightening of the river channels for transportation; run off arising from clearance for 'road' construction; increased temperature from loss of the canopy. Within the USA the Environment Protection Agency classifies temperature as a pollutant when measuring water quality. The other significant industry of mineral extraction has resulted in pollution, damming, and associated land clearance.

There has been a massive increase in both size and quantity of sub-strate, and a resultant loss of both salmon and beavers. There are very few jobs other than logging, this has had an impact on agricultural drainage and disconnection of the flood plains. Reclamation of the salt marshes has resulted in abstraction and pollution. Also the need for energy has been dealt with by damming, and resultant fish barriers, sub-strate barriers, temperature and flow changes. Urbanisation has also had a negative impact on the rivers.

The comparative industry in the UK is mining. That has left us with a legacy of disconnection of estuaries, clearance for road building, lost rivers, tree clearance, urbanisation, and the resultant loss of resilience to e.g. effects of climate change.

Solutions to these problems employed in the Pacific North West include

- **Reconnecting the river with its flood plains.** In the main the land is too wet to get heavy machinery in so they have resorted to the use of dynamite & other explosives! After the first attempt this method worked so well that it is now the method of choice. Also as dykes fall into disrepair there is no attempt to maintain them, and the water breaks through. The resulting brackish water is very good for juvenile salmonids.
- **Restoring old channels** - this is a huge task as there are multiple channels, through woody areas. The enormous amount of woody debris causes log jams - these have to be removed by use of a Chinook helicopter at a cost of \$10,000 per hour (there is no road access). The exposed sub-strates are now becoming covered again, returning to a more natural composition and are successfully being used as spawning grounds. They also experimented with the introduction of large boulders however this did not work - possibly because they were placed too far apart. Instead more upstream areas where logs have been introduced have had excellent results with good quality gravel bars forming on top of the trees.
- **Leave it to the beaver** - streams were reclaimed for agricultural use, vegetation has been planted, culverts replaced with bridges, and finally beavers re-introduced. Beavers form dams during the spring, the size of the dams being proportionate to the size of the stream in which they are built. Downstream of the dams riffle areas start to form, and the temperature of the stream has decreased below these dams by as much as 6°C. The temperature decrease is thought to be a result of the increased depth and flow of the water. There is no evidence to date that these dams prove an obstacle to salmonid migration, however this will continue to be monitored as the beaver populations grow.

- **Restoring access** - removal of the dam for a Hydro-Electric power station, replacing culverts with bridges, re-designing tide flaps which previously prevented fish access to the streams. These now have a side opening and a door which opens when the pressure is equal on both sides even when the tide flaps are closed. This has increased spawning access to the streams and there is a greater juvenile survival - possibly because the water has become increasingly brackish.
- **Removing concrete** from alongside the roads and slowing down the run-off from the roads giving it time to percolate through. The river is very flashy, and the objective was to reduce the volume of water going through the storm pipes into the stream. Since the work was carried out there has been a massive reduction with the storm pipes rarely being utilised.

This last point illustrates well how the increasing areas of our country that are covered by impermeable surfaces (roofs associated with house-building, road building, and paving over of front gardens to provide hardstanding for vehicles etc) contributes to increasing flood risk.

Rob Strachan, WildCRU Chichester Coastal Plain Sustainable Farming Partnership

This talk detailed a project by the Wildlife Conservation Research Unit (WildCRU) whose Sustainable Farming Initiative aims to increase biodiversity at a landscape scale. Water voles were chosen as the key indicator species as there has been a 95% decrease in numbers in Sussex in the last 20 years. Water voles colonise by dispersal, have 5-6 puppies per litter and have between 3 and 5 litters per year. The pups are weaned in 22 days, and reach sexual maturity in a matter of weeks, they may even breed themselves in the same year. Generally speaking those from the earlier broods are more likely to survive the winter (due to their increased weight). To ensure a good genetic mix it is ideal to have a cluster of around 8 or 9 colonies within a geographic area. Mink is their major predator

The Chichester Coastal Plains are very intensively farmed, so there is little space for wildlife - if water voles could be established in this area, it should be possible to establish them anywhere.

In 2000 a baseline survey was done which showed less than 100 individuals. The first challenge was to remove the mink. A mink trapper was employed by West Sussex County Council, and after 2003 no mink were present. Whilst this was going on, other work was being done to engage the farmers and land owners. Farm conservation plans were drawn up which included reports on what wildlife was present, and what the farmers wanted from the land. Once one farm was done, they moved onto the next, and that plan included reports from the neighbouring farms - in this way connectivity was built in. Between 2000 and 2003 plans were drawn up over 42 landholdings (which covered more than half the land in this area). These were managed under Countryside Stewardship, and under this scheme buffer strips and farm ponds were created, as well as fencing close to the banks to manage cattle and protect wildlife. There was also some experimental re-stocking where it was felt that colonisation was unlikely - these were radio-tracked.

In the areas that were fenced a significantly greater number of water voles were established than in the unfenced areas - this was attributed to their habitat not being trampled by cattle. Rotational ditch management was also employed - banks were left unmown in alternate years, and they were protected by a 6m wide margin which was left unplanted. This had the effect of not only increasing the population of water voles, but also of barn owls. In the first 3 years of the project there had been a 3 fold increase in the number of water voles, by 2006 this had increased to 4 fold.

This project has illustrated the importance of 'joined up thinking' i.e. of taking a landscape approach to habitat enhancement. It is now being rolled out along the River Ray in Oxford in the upper reaches of the Thames. The success of the project relies on a twin track approach - habitat restoration in conjunction with mink control.

Bryony Coles, Archaeologist Exeter University

In the 1970's at an excavation on the Somerset Levels this speaker found pieces of wood that had been worked but she could not identify by what. 2 years later the workings had been identified as marks made by beaver. This sparked a desire to know more about the history of the beaver in Britain and how to identify their presence from an archaeological perspective.

By 1900 there were very low numbers of the European Beaver (and none in Britain), they only existed in 3 areas of mainland Europe. However later in the 20th Century populations were actually expanding. Beavers have 2-3 kits in a litter, and these stay with their parents until the following year's kits are born when the older ones leave. Evidence of beavers' presence include gnawed wood and dams in the presence of freshwater (not salt water). Contrary to some people's belief, beaver dams do not block water flow - they are built in such a way as to permit the passage of water through them. Presence of a dam results in a diversification of water in the area around the dam - a combination of deep pools, and a mixture of slow and rapid flow in the by-pass channel.

In order to learn more about beavers the speaker became involved in a project to excavate abandoned dams. The British Archaeological records were searched to find evidence of beavers. 'Britain' was abandoned by beavers during the last ice age. Late glacial beavers re-colonised, as did the humans, long before fish. Early post glacial beavers gnawed birchwood. There is evidence of human exploitation of beavers - tools were modelled on their incisors, and their meat was eaten. Beavers are a similar weight to Roe Deer, and up to about the 15th Century beaver was seen as a very high status meat. The last beaver record in Britain was in 1789 - this was much later than had originally been thought, but on large rivers a dam is not necessarily needed - without this indicator unless you know specifically what to look for it would be very easy to assume that beavers were not present.

Beaver dams bring about biodiversity - the resultant ponds increase water volume. On small streams in Brittany with beavers there has been a 6fold increase in water volume on those streams with beavers compared with those not having beavers. Beaver ponds will also hold storm water and silts. A leaking dam can hold the water back for several hours, in a well maintained dam the water could take 2-3 days to percolate through.

Gerhard Schwab

The subject of this talk was Beavers in Bavaria. In Bavaria beavers had historically had many uses - the pelt was used, meat was eaten (it could even be eaten during lent as it was seen as 'fish' rather than meat), and castoreum (which the beaver used for scent marking) was used in medical remedies. Beavers became extinct in Bavaria in 1908, however they were re-introduced over a period from 1966 to 1982. Figures from 2006 show 2,500 beaver territories, which equates to about 10,000 beavers. Between 1996 and 2007 850 of these beavers were re-located as part of projects within Europe - this includes some re-located to 'secure' locations within Britain.

Beavers are very adaptable - they have established themselves in Munich (population 1.2million) where they have moved into culverts. Elsewhere beavers have changed the landscape in which they live. They build dams where the water is not sufficiently deep, feed on trees such as willow in winter - this creates a rich environment as it permits the growth of other vegetation. The result of beaver presence is that water is kept in the landscape - signs of this can be used as evidence of their presence. The result of more water in the landscape has been an increase of fish species - the number of species has more than doubled in the years post beaver introduction, as there is more varied environment. Latest news is that more research projects have been commissioned to look at the effects of beaver presence on a species by species basis.

Streams where beavers have become established have seen a 5fold increase in the amount of dead wood within the watercourse. This creates an excellent habitat for fish, with an increasing density of fish numbers in the water around the dam and lodge. This dam is not a barrier for fish - they easily find their way through or around. There has also been an increase in plants, birds, amphibians & reptiles, and dragonflies. The majority of effects have been positive, however there have been a small number of negative effects.

Beavers benefit wildlife by creating wetlands, they benefit man by creating natural floodplains which provide the best possible flood protection. There have been some problems - namely beavers feeding on crops in nearby fields, feeding on trees, digging burrows, and the dams causing nearby roads to flood - water being pushed back into the settlements built on the floodplains. However the speaker stressed that all of these can be solved. The best solution is making space for the water. Mesh can be placed around the base of 'expensive' trees, the dam can be lowered or removed where it causes a flood risk, mesh can be placed over the ends of pipes to prevent sticks being placed in them, electric fences around crop fields - after a week the beaver learns and will move on, and the last course of action is trapping.

76% of the Bavarian beavers pose no problems - those that do are located in areas of high human use. Most of the problems are small with easy solutions. Many problems are the result of lack of knowledge. The majority of Bavarian people want the beavers. Beavers don't need wild nature - they create it. The benefits of having beavers (including tourism) outweigh the negative. Beavers have 15million years of experience in water management.

Roy Dennis, Highland Wildlife Restoration Group

Our final speaker spoke about projects to increase numbers of certain large water birds in Scotland. He encouraged us to get young people involved since without help certain species would not survive, and people will only help if they care.

Sea Eagles - historically they were present all over the UK, there are now 40 pairs in Scotland. Work that has been done in the Western Isles means that population is now deemed to be secure. As a result Ecotourism is worth £1million - the Isle of Mull is a view point, eagle tours are run, people provide accommodation etc. New releases are planned for the East Coast of Scotland, SE England, Wales, and Ireland.

Ospreys - there are now 200 pairs, there should be 2000. Between 1800 - 1918 there was a severe decline, numbers are now rising slowly in Scotland. Reasons for the decline are a difficult migration to Africa - many get lost at sea, particularly between the South Coast of England and Brittany/ Normandy. It is known that Osprey colonies initially increase and then level out. The best feeding areas are where the birds can get to estuaries and/ or lakes. Most young Ospreys rely on using nests of a bird that has died. Some success has been seen from building nests for Ospreys to use - the group have instructions on how to do this on their website for anyone that is not afraid of heights! In addition to nest building there is also a need for more birds to establish themselves in a colony. Unfortunately in some areas rarity is seen as equating to value, and there is a reluctance to permit re-location of the birds. If birds are re-located to England from Scotland people won't need to go to Scotland to see them.

Black Storks are often associated with Beavers since they like clear water in woodland. They are therefore a good indicator species. A Swedish project is underway to re-introduce the White Stork. Cranes are another large water bird that could do with larger numbers. The Lesser Spotted Eagle is gradually moving westwards - there is a pair in France, this bird needs rich river habitats.

Overall numbers of large water birds are gradually recovering from the Middle Ages when numbers were dramatically reduced due to Man's habit of eating them.

There are so many opportunities for the future, providing we don't act too late.