



Newsletter

November 2008

We aim to work in friendly collaboration with landowners and farmers, conservation organisations and relevant public bodies.

River Restoration Project – Stody Estate

The project is a partnership approach to restore a stretch of the River Glaven downstream of the Hunworth railway bridge that has existing good environmental status. However it has been over-widened and dug out in the past to drain the meadows, and reduced the potential for in-river wildlife, particularly brown trout.

The river work will be carried out by the Environment Agency, with technical supervision by Professor Richard Hey, and the support of the estate and the River Glaven Conservation Group. Originally planned for late summer-autumn, due to the wet ground conditions, in combination with a strong river flow, the work has now been re-scheduled for April 2009.

The initiative came about because the estate was abstracting water from the river in the summer to irrigate its crops, and felt that it would be better for wildlife to abstract in the winter from high flows into a storage reservoir for later summer use. In order for the Environment Agency to be able to amend the licence, wildlife and river flow surveys were taken, and from that work has developed a strong partnership around a common goal of improving wildlife biodiversity, whilst maintaining farming and the rural community.

We believe our project is innovative and ground breaking, and owes a lot to the enthusiasm, commitment and tolerance of all partners. The survey work undertaken will mean that we will be able to monitor in a unique way the effects of what we do. It is difficult for a non academic like me to sum up this project in a few lines, and I cannot speak too highly of the painstaking work that so many have put in already, much for little or no reward, solely for the benefit of wildlife and the river. It is a fine balance, not least with having to meet the challenges of a rapidly changing international market.

Part of the estate involvement necessitates the construction of the reservoir to store water for irrigation. To this end we are close to applying for planning permission to do this by taking gravel out to leave a hole that we shall then line to hold the water. The sale of the gravel will contribute to the cost of building the reservoir and grant funding will be sought for installing the pumping equipment. Stody estate is also working with neighbours and specialist growers in this project.

Ross Haddow, Farm manager, Stody Estate.



Gone Fishing

The Environment Agency is best known for its responsibility in managing flood risk. This accounts for much the largest part of the operational budget, as might be expected. The longstanding role of the Agency in protecting and enhancing biodiversity is less well known, and is extremely important in relation to a modest expenditure. One aspect of this is to periodically survey the fish population of our rivers. The survey is carried at the same fixed points about every six years, so that long term trends can be evaluated.

The name 'Fisheries Monitoring Programme' gives an indication of the historic interest in angling. Today however it also gives a wider indication of the 'health' of the river system, for species such as otter, kingfisher and heron, and for aquatic plants and invertebrates.

I watched the survey process at Little Thornage on the 21st May, on a 200m stretch upstream of Letheringsett Ford. This is the lower reach of the Cinderella project, where we introduced riffles, river narrowing and the use of large woody debris as flow deflectors.

A stop-net is placed across the river at either end of the survey length. The fishing operation was conducted by two people in a punt and one wading. A generator power box in the boat supplies the 'electric' pole held in the water. The fish are stunned and held in one tank for eels and a separate one for all other fish.

Three runs of the survey length are made to ensure that little or nothing remains uncaught. The stop-nets means there are no escapes; and also prevent fish entering from upstream or downstream of the survey area. The fish are held in the tanks so that no fish are returned and then re-caught; and that fish are not at risk from multiple stunning.

The captured fish are identified, measured to the fork length, weighed, and scale samples taken for laboratory analysis. All fish are then returned to the river. The National Fish Laboratory provides information on the aging and growth of the catch, and the data is then used by the Agency's National Fish Population Database to give population estimates, standing crop (biomass) and densities calculations.

Across the seven sampling points on the Glaven thirteen species of fish were caught. As in previous surveys the population is dominated by the European eel and brown trout. Large numbers of bull head and brook lamprey were

also caught, species both protected by the European Habitats Directive.

The mean standing crop, the weight of fish in a given area, was greatest downstream of Letheringsett Hall, followed by upstream of Glandford Mill and upstream of Letheringsett Ford. The greatest density of brown trout were caught downstream of Letheringsett Hall, followed by the Little Thornage reach; and eels in the greatest number by a long way (306) upstream of Glandford Mill. (We speculate that the numbers of brown trout in places may be affected by some stocking by angling interests).

The report notes that 'many of the brown trout caught in the 2008 surveys were less than 99mm, revealing very good recruitment of juvenile fish for the two year class and hence suitability of spawning substrate in the river. Continued habitat restoration in the River Glaven where appropriate should improve this further'.

For the record, the number of fish species caught above Letheringsett Ford, the Little Thornage stretch were: 2 3-spined stickleback, 29 brown trout, 39 bullhead, 25 eels [larger than elvers], 2 brook lamprey, 4 perch, 1 pike, and 6 stone loach.

Ian Shepherd.



Crucian carp - a native fish on the brink

The crucian carp (*Carassius carassius*) is a species of freshwater fish that is native to south-eastern England, originally spanning from Norfolk to Kent, where it is characteristically found in small, weedy ponds. The exact distribution of crucian carp in England has been confused by a strong resemblance with the natural-brown variety of introduced goldfish *Carassius auratus*. However, once this confusion was resolved in the 1990s, it was realised that the number of true crucian carp populations was very low, and a decline of the species has been reported due to a combination of potential factors; most notably hybridization with goldfish (presumably transferred to field ponds from garden ponds) and with common carp (*Cyprinus carpio*), but also changes in pond habitats including silting and drying up events. Consequently, the crucian carp is now recognised as being threatened throughout most of its range in middle and northern Europe, including the UK.



Remarkably, even today very little hard information exists on crucian carp populations in Norfolk and this has resulted in speculation that "*The species is thought to be almost extinct in Norfolk*" (Environment Agency, 2008). So what of crucian carp in the Glaven valley? Is the species actually extinct? At least until the 1980s many of the marl pit ponds of north Norfolk contained crucian carp and local fisherman enjoyed catching them, including myself. However, it occurred to me a few years ago that I could not think of a single pond where I could catch one...

This article is partly a plea for information. Myself and a research team from University College London, linked with the Centre for Environment Fisheries and Aquaculture Science (CEFAS) in Lowestoft and British crucian carp expert Keith Wesley (Bedwell Fisheries Services) have started to survey small potential 'crucian ponds' in North Norfolk and in October 2008 we looked at 10 small marl pits, in the Glaven valley. We did find crucian carp but, the number of "safe" crucian carp ponds where habitat is good and other carp species are absent was extremely low (1 out of 10). Therefore if anyone thinks they know of a place where the crucian carp used to or perhaps may still thrive I would love to hear from you. This is a beautiful little fish and it would be such shame to lose it...

Carl Sayer

e-mail: c.sayer@ucl.ac.uk, 07766717245

Cinderella is a CPRE Norfolk Annual Award Winner.

The RGCG continue to monitor the maturing of the 'Cinderella' project on the restoration and enhancement of the river work carried out in October 2006 at Little Thornage meadows. One pleasing outcome of this work has been the increased number of visits by Holt Hall Field Studies Centre. Norfolk schools up to A Level standard benefit from this link to the geography curriculum.

The RGCG received further recognition for this project at the CPRE Norfolk annual awards ceremony on the 6th November. An appreciation of the work of CPRE was given by the national President, Bill Bryson.



CPRE President
Bill Bryson

Ian Shepherd

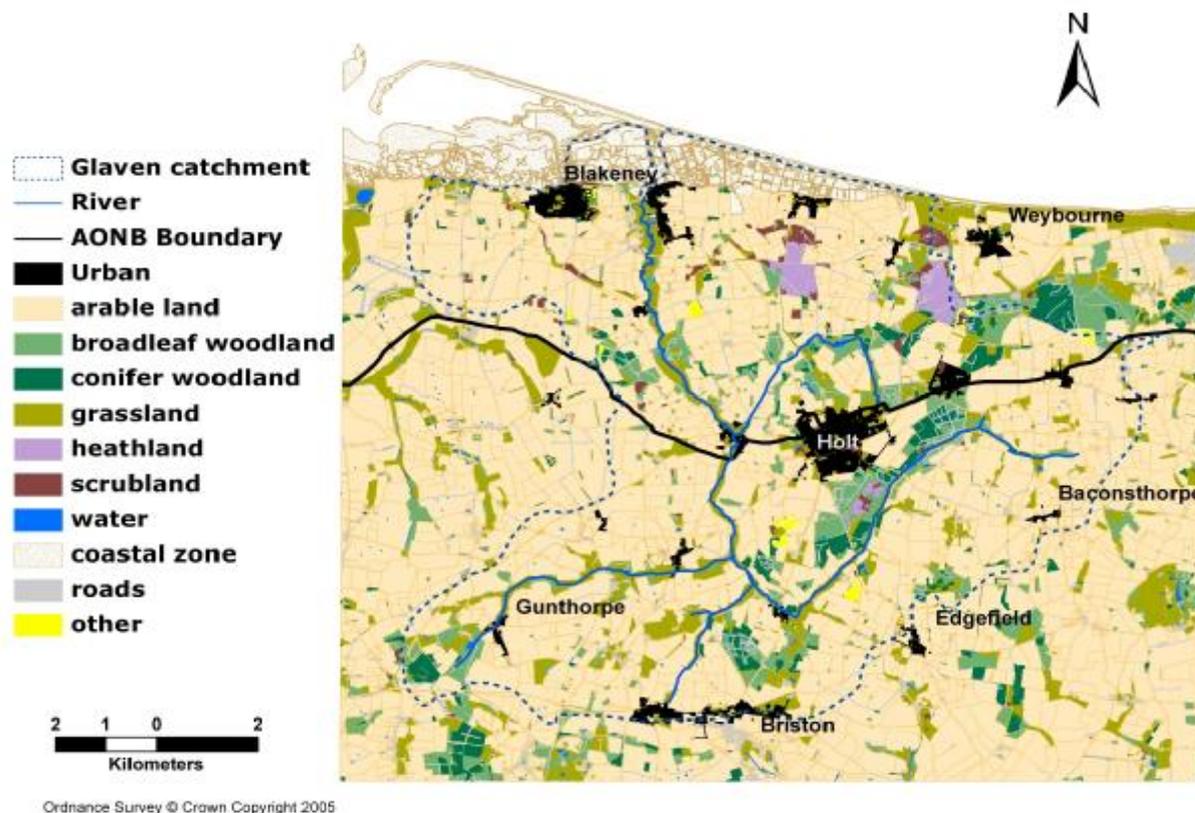
Steve Henson

Whole landscape research in the Glaven: A river its people and land use

The Glaven is a great place to do research; I have met fine people, discovered great beauty and learnt much that has transformed my thinking. My research began four years ago when I was funded by the University of East Anglia (UEA) and the Norfolk Coast Partnership, to study the landscape of the River Glaven. My task has been to investigating the benefits and limitations of doing more integrated whole landscape management in the Glaven

What I am doing is a relatively new kind of research, I have not run any experiments, rather I have talked with many people who know the Glaven, studied management plans and the scientific literature and I have used what I have learnt to developed two possible futures for the Glaven catchment in 2020. One of the most enjoyable and important parts of this research has been to talk individually to thirty-nine landowners and farmers active in the Glaven catchment, specifically to learn more about current farming practice and the future of agriculture more generally.

Using some of the latest map making technology I then build two alternative futures one driven by agricultural production and world trade, the other driven by enhanced environmental protection and multi-objective land use and compared them to the current state of the Glaven.



The latter is rather a mouth full as one prominent Norfolk landowner pointed out to me; he suggested I could rephrase the question to essentially communicate more clearly the same thing by saying;

"How do we make a landscape that is fit for our grandchildren?"

With this question in mind the participants of the workshop, facilitated by the UEA research team including Prof. Tim O'Riordan, Prof. Andrew Lovett, Prof. Andrew Watkinson and myself came up with the following:

- Some form of partnership should be established that would be composed of a range of people to develop a shared long-term vision with a clear set of objectives. This partnership would draw on lessons from existing partnerships that people already have experience of, such as the River Glaven Conservation Group, the Norfolk Coast Partnership, the Association of River Trusts and the Wensum Valley Project.

- Initially there would need to be some funding available for a key person to explore the building blocks and facilitate development of the partnership. This would be a pump priming arrangement that would assist the embryonic partnership on its road to self-maintenance. This could be in the form further research through the University of East Anglia.
- The partnership would build on existing successes in the catchment, notably;
 - Cooperation between Glaven farmers and the sharing of best practice
 - Strong support for the Catchment Sensitive Farming initiative aimed at aiding the reduction of diffuse pollution from agriculture.
 - High uptake of environmental stewardship schemes by farmers and landowners.
 - The continuing restoration and conservation of river habitats by the River Glaven Conservation Group.

My time studying in the Glaven has clearly illustrates that the catchment has significant potential as an exemplar of best practice in agriculture, landscape management and river restoration that is simultaneously profitable, environmentally healthy and ultimately a great place to live and work now and for future generations.

If you have any questions about this research I would be happy to hear from you, I can be contacted by email at a.southern@uea.ac.uk . Also if you would like to see copies of the full workshop report please visit my website at <http://researchpages.net/people/adrian-southern/projects/glaven/workshop/> .

Adrian Southern, PhD student, UEA.

UCL students at the River Glaven

This summer several students from the MSc in Freshwater and Coastal Science run jointly by University College London and Queen Mary University of London undertook dissertation projects at the River Glaven. All of the projects were designed to feed into current and proposed restoration work on the river and details on the key findings of this work will be given in our spring newsletter.

In short there were two studies of in-river habitats (Anna Doeser and Ruth Richardson), one focusing on the distribution of different flow/sediment environments (so-called mesohabitats) and another on invertebrate responses to this habitat variation. Luke Mitchell focused on the food webs of open and closed canopy sections based on sampling of fish, invertebrate and algal communities over short sections.

Another study focused on floodplain meadow plant communities ("Kat" Wotherspoon) and links between meadow management histories and species diversity. Finally, and so as not to leave out the stillwaters of the Glaven valley, a further study (Sebastian Meis) looked at seasonal variation in lake plant communities at two Glaven sites. We hope to see further MSc studies of the Glaven system next summer.

There are currently two PhD-level studies of the River Glaven, both of them focusing on wet meadow ecology. Hannah Clilverd has been working on the river for just over one year now and has been studying the hydrology, soils and vegetation of the proposed Stody Estate restoration site at Hunworth. The aim of this work is to provide "before and after" information so that we can judge the success of restoration.

Tori Shepherd has recently joined the team having been inspired by the Glaven during her undergraduate dissertation studies (Tori was a student of Manchester University). She is back and is planning to study floodplain vegetation and beetle relationships in Norfolk rivers, including, yes of course, the mighty Glaven.

Carl Sayer



Hannah Clilverd

Food webs of the River Glaven

As the picturesque River Glaven flows from its headwaters at Lower Bodham and Baconsthorpe into the North Sea, it winds its way through open meadows and 'wild' areas with thick riparian tree cover. In the open meadows, sunlight penetrates through the canopy stimulating algae growth. However, under a thicker canopy, the foliage prevents much light reaching the river, thus inhibiting the growth of algae. In these stretches 'detrital matter' comprising leaves, twigs and branches provide nutrition and shelter for stream inhabitants.

The aim of my study was to describe and compare the food webs (the way species are connected together via feeding links) from these two differing habitats. Because algae are a nutritionally richer and a more energy efficient food source, stretches of the river flowing through open meadows were expected to support greater community abundance and harbour larger individual species.

Six sites were sampled between Letheringsett and Hunworth, three open meadow sites (an algae-based food web) and three riparian canopy sites (a detrital-based food web). These sites were sampled over late May and early June. Algae, invertebrates and fish were counted, represented visually and compared statistically.

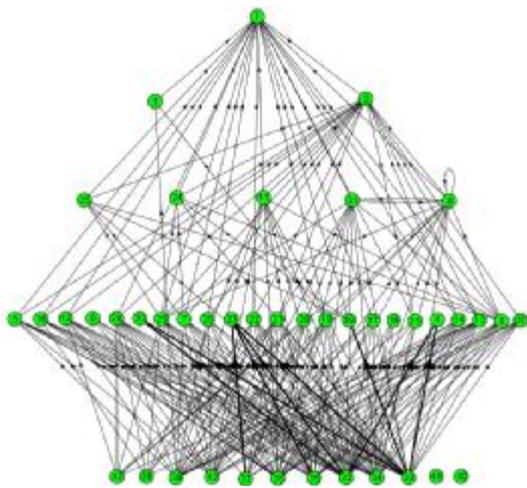


Figure 1. Food web depicting the detrital-based food web. Each circle represents a species. The lower level is algae, the lower middle two levels are macroinvertebrates and the top levels are fish. Lines indicate a feeding relationship and arrows indicate the flow of energy/nutrients.

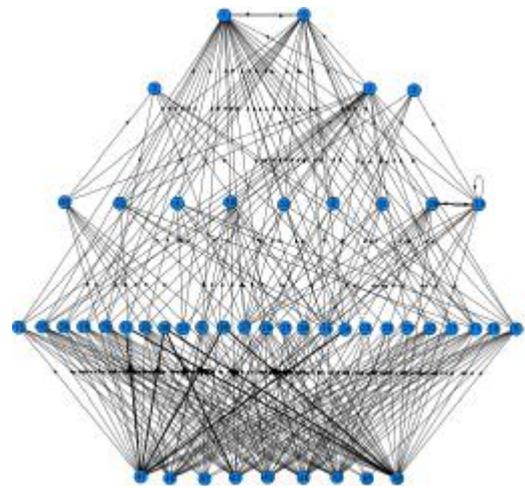


Figure 2. Food web depicting the algae-based food web. Each circle represents a species. The lower level is algae, the lower middle two levels are macroinvertebrates and the top levels are fish. Lines indicate a feeding relationship and arrows indicate the flow of energy/nutrients.

The open meadow stream food web was characterised by higher species diversity and an increase in feeding interactions (see Figures 1 and 2), as well as a shift in the community structure and productivity. This is a more complex and stable ecosystem than the shaded habitat community. Certain species within the River Glaven play a central role in maintaining the balance of the system. The removal of these species could rapidly propagate extinctions within the food web and could lead to a destabilisation of the ecosystem. Each habitat (meadow and forested) is at risk of these unstable actions, however, the less stable detrital-based habitat is at greater risk. This study suggests that 'bullhead' (*Cottus gobio*) could potentially be a "keystone" species and of vital importance to the River Glaven food web.

The popular pursuit of angling on the River Glaven needs to be monitored well, as removal of the larger predators (brown trout and eels) from the ecosystem could have a destabilising effect. It is recommended that angling clubs promote catch-and-release of wild trout amongst their members.

This study provides an indication of the importance of detrital input to stream ecosystems. Although algae abundance is >362% higher in the open-meadow habitat, the detrital network still maintains high abundances of invertebrates and fishes. Any future restoration carried out on the River Glaven will do well to consider the vulnerability of the wooded habitats spread along the course of the river.

MSc project of Luke Mitchell [contact Carl Sayer]

AGM success



The RGCG held their AGM on the 19th April at Cley Village Hall. A large and interested audience heard a talk by Peter Dokter and Rod Hicks of the Environment Agency on the re-alignment of the Glaven outfall into Blakeney Pit, and the associated work on improving the sluice system on the west bank of Cley Marshes.

The work was completed in October 2006, and was preceded by a high level of evaluation and planning of the scheme. The work continues with on-going monitoring on how the work 'settles down', and river and wildlife change and adjust.

Following the completion of the engineering works the natural regeneration below high tide mark is being studied, and the changes in sediment patterns within the Glaven. In 2006-07 baseline monitoring of shingle vegetation and invertebrates took place; and in 2007 the vegetation monitoring of the Glaven salt marshes and Blakeney Eye, and this will be repeated in 2009 and 2011. The annual monitoring of the shingle ridge profile and aerial photographs will continue.

This was a very successful project in engineering terms, and running alongside this the studies on physical and ecological changes. It provides a template for future work on other similar works on the East Anglia coastline.

Water vole survey



Photograph courtesy of Ann Roberts, Norfolk Wildlife Trust

A water vole survey was carried out at Hunworth by Steve Henson, NWT and RGCG committee member, on the 2nd October. This was done in the expectation of river restoration work starting this Autumn, now delayed until April. However, as the voles are not active in the winter season, the study will still be valid then. The water vole is a protected species, and the level of protection has been increased since April 2008 with amendments to the Wildlife and Countryside Act. Care has to be taken to ensure there is no adverse impact on a population when carrying out river enhancement.

The position of burrows, latrine areas and feeding stations along the length of river are identified and recorded with the GPS position.

They are also staked out with bamboo canes, and plans for alterations to the banks modified as required to give a 3m buffer zone around each burrow. Any damage, obstruction and disturbance to the water vole is prohibited. The Glaven still has a good population, but nationally numbers have decreased by 90%, mainly due to the predation by American mink.



Newsletter

November 2008

NEWS IN BRIEF

- The great threat presented by invasive non-native species has been recognised by a county initiative to set up a data base providing information on their distribution in Norfolk. In previous Newsletters we have mentioned that the Glaven is one of the few river systems in the greater south east to be relatively clear of the signal and other imported crayfish, which wipes out the native white-clawed species; how Himalayan balsam can cover and smother all other vegetation on a river bank; and see the water vole above. Less well known is the damage that can be caused by aquatic plants and discarded by the public, along with the goldfish. Some can rapidly spread and choke the whole surface of a river or pond. This is a likely candidate for our next AGM talk.
- Committee member Jim Crossley has organised a small syndicate which will see more much needed conservation grazing by Highland cattle in the lower Glaven valley. The group have bought five cows and calves, with more calves on the way. The grazier will tend the cattle, and the return from the beef will be split 50:50
- Tim Jacklin has joined the Wild Trout Trust, moving from the Environment Agency. He is managing the North Norfolk Sea Trout Project. In the first stage of the programme Tim is carrying out a survey and evaluation of the barriers to migratory fish on each of the rivers, and the amount of good spawning habitat. Tim was given a guided tour of the barrier structures on the Glaven on the 29th September, from the Cley tidal sluice as far upstream as Hunworth
- The Stody Estate have received an accolade from Natural England, winning the award in the East of England Region for the work carried out by a farm on behalf of the environment and wildlife.

More conservation volunteers needed



The Highland cattle at Little Thornage meadows came off in late October, having been active with grazing conservation work since May..... It is our turn now!

There is a range of tasks to be done, such as clearing the remaining piles of brushwood, hand cutting and clearing vegetation along the banks of the drainage ditches, and some hand tool de-silting of the ditches. If interested in helping with this work over the coming months, then please contact either Ian Shepherd or Steve Henson at his Norfolk Wildlife Trust office 01603 598312

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