

Upper Hunter

RIVER REHABILITATION INITIATIVE

UHRRI Update

No. 3, September 2005

From the Project Manager

UHRRI and the associated ARC-Linkage research projects are now in the middle of their five-year terms (2003 – 2007). Admittedly, UHRRI had its beginnings before 2003, but it is still remarkable how much has been achieved in the 2½ years since it was formally established. To establish industry partnerships, conceive of and implement the very large-scale wood installations, establish a large-scale planting program, and get five PhD projects up and running is no mean feat. It has not all been rosy, of course - poor tree survival through the drought has been disappointing – but overall I think the project's achievements have been strong.

The research is now in a middle phase of data collection and analysis, moving into a phase of communicating our findings to various audiences – including scientists, river managers, community groups, and industry partners. This is also the time to apply what we've learned to date and build further support for ongoing river rehabilitation on the Hunter. It is also timely to begin thinking about the future of UHRRI and ARC research beyond the current five-years arrangements.

Over the next few months, we will be considering how best to communicate the findings and successes of the project, and working out the direction of the project in 2006-2007 and beyond.

Mark Sanders
Project Manager, Upper Hunter River Rehabilitation Initiative

Revegetation monitoring

This week Dan and I finished measuring survival of the large-scale plantings undertaken in the early days of the project. Large-scale plantings started at the project launch site (by Keys Bridge) in November 2002, and continued through to Feb 2004. During this period, 38,600 trees were planted by volunteers, Green Corps, Department of Lands and contract planters. We estimated survival at each of 12 sites by walking transects, finding a sample of the bamboo stakes and tree guards that marked planting locations, and assessing survival and growth of the tree that was planted at each stake.

Our results confirm that survival and growth of these plantings has been highly variable. At some sites, or patches within sites, we have seen good survival (70% – 80%), and growth (trees reaching 2 – 6 m). Our careful searching often revealed more trees surviving than was obvious at first



Muttonwood (*Rapanea variabilis*) growing near Bengalla Pump Station.

glance. For example, we found that 35% of trees planted under willows near the Bengalla pump station have survived – these include red and white cedar, tree violet, casuarinas, and muttonwood. Also, we often found trees regrowing from the roots of dead stems.

However, most of the plantings suffered badly as a result of the drought and the lack of resources for follow-up watering. Overall, we estimate that 14% (\pm c. 6%) of these early plantings have survived to date.

Since mid-2004 a further 6635 trees have been planted (including Gareth Kyle's experimental plots). Our monitoring of these trees indicates a survival rate of 51% to date. A more detailed report on all of these results will be prepared in due course. Overall survival rates are summarised below.

Estimated survival of all trees planted by UHRRI, as at October 2005.

Plantings	No. of trees alive	Total planted	Survival rate
Pre-2004	5533	38600	14%
Post-2004	3365	6635	51%
Tatyana's plots	216	704	31%
Total	9114	45939	20%

Revegetation bid

In August, we submitted a bid to the Hunter-Central Rivers Catchment Management Authority to do a further 26 ha of plantings along the UHRRI site. The bid includes engaging professional planting contractors, planting in autumn/winter, allowing for follow-up watering and weeding, if necessary, and monitoring. The two landholders, Bengalla Mining Company and Mt Arthur Coal, have provided extra support for the bid by undertaking to prevent invasion of climbing vines into planting sites. The bid also includes some small trials of mulching, direct seeding, and a 'high-care' planting regime for difficult to establish species. Outcome of the bid process is expected to be announced in November/December. If successful, we anticipate starting planting in autumn.

Technical manual – wood reintroduction

A manual on reintroducing wood into rivers – informed largely by our research on the Hunter – is currently being written by Dr Andrew Brooks. This should be completed early next year, and will be published by Land and Water Australia.



Engineered log jams at the 'Fish Riffles' site on the Hunter River.

ARC-Linkage Research

Jo Hoyle has recently returned from attending two conferences in Europe. She delivered a presentation at the Fluvial Sedimentology conference, in Delft, Netherlands, and Gary Brierley presented some of her work at the Gravel Bed Rivers 6 conference, in St Jakob, Austria.

Since returning, Jo has been back in the field installing dozens of scour chains along the study reach. Scour chains are designed to record both erosion and deposition at a site during flood flow. They consist of 1 metre of



Jo Hoyle and her 10,000 beads.

threaded beads inserted vertically into a sediment profile. During a flood, the number of beads corresponding to the amount of sediment eroded are released into the water column, but retained on the thread, giving an accurate measure of eroded sediment. Because the beads are disturbed from their original position, any re-deposition of sediment can also be recorded.

Tim has been finishing off surveying his study riffles with DIPNR surveyor Rod Gleeson and completing another round of electrofishing along the UHRRI reach. This survey has added two new species to his list: flat-headed gudgeon and short-finned eel. Tim also reports that the pool structures have produced high numbers of fish. Despite the workload he has still managed to land a sizable haul of bass from just a couple of evenings of casting.

Sarah has spent many hours analysing hundreds of kilos of freeze-core samples collected over the preceding months, before embarking on a research trip to New Zealand to study some of the vast gravel bed rivers of the South Island. After this trip, Sarah returns to the Hunter to carry out another episode of post-wood data collection and more experimental work.

Congratulations to Ben Wolfenden for receiving the award for best presentation at the annual postgraduate conference of the UNE School of Environmental Sciences and Natural Resource Management, held at the Coffs Harbour Marine Science Centre. Ben presented a seminar on his research on organic matter dynamics and rehabilitation.

For the coming months, Ben has an intensive period of fieldwork planned. This will involve the placement of hundreds of leaf-packs into a number of riffles both on the Hunter and the Williams River. Ben has been carrying out decomposition studies aimed at understanding the potential for river red gum and river oak leaf litter as nutrient and energy sources and comparing them with existing willow litter. These studies will help to understand the consequences of changing litter regimes in the Upper Hunter through riparian revegetation.

Garreth is still chained to his computer but is planning on further plot monitoring and other work during a couple of weeks in November.

Geographic Information System

The ARC-linkage research and UHRRI operations have produced a huge amount of information, that can be linked to specific locations on the UHRRI project site. To ensure that this information is readily accessible in a useful form, the ARC-Linkage funds have been used to engage John Spencer at Griffith University to put together an ARC-UHRRI Geographic Information System. As well as having simple mapping and presentation functions, the GIS will enable powerful analyses of spatially-explicit data.

UNE Field Trip

Forty third year students from University of New England visited in July with Dr Darren Ryder as part of their Ecosystem Rehabilitation course. Dan and Mark met the

students at the launch site, where they measured tree size and density, and various environmental factors, with a view to relating tree survival and growth to site conditions.



Students from the UNE prepare to collect soil samples and revegetation data on the UHRRI site.

Flow stage recorders

A small but significant milestone during July was the successful installation of the eighth and final stage recorder on Keys Bridge by Dan Keating and Jo Hoyle. These stage recorders are sealed electronic units that are placed in the water to collect a continuous record of water depth. They require a well-secured vent tube at the top of the river bank,

well above maximum flood level, so present something of a challenge to install! The recorders provide invaluable, detailed data that will help us understand how different flows affect sediment transport in the river. Jo Hoyle in particular will be using this data for her hydraulic modelling work. The installation of the final recorder on the bridge is significant, because this is the most robust site in a flood – and flows during floods are the ones we are most interested in because of their potential to cause large changes in the river. Having said this, we are investigating obtaining one further high quality data logger to be doubly confident of obtaining reliable records during a flood.



Media Coverage, Presentations, CCC

Since the last newsletter, UHRRI and ARC-Linkage research has continued to attract positive media coverage, with two interviews on ABC radio – local and national - and coverage in local and Australasian newspapers. Mark and Dan have made presentations to RioTinto’s Australasian Water Workshop at Bengalla, and at Macquarie University. The UHRRI community consultative group met on the 6th of September, and visited White’s Creek vineyard to inspect previous plantings and the site of proposed future plantings.



UPPER HUNTER RIVER REHABILITATION INITIATIVE, C/- NSW DEPARTMENT OF INFRASTRUCTURE, PLANNING AND NATURAL RESOURCES
 PO Box 297, LEVEL 2, 160 BRIDGE STREET, MUSWELLBROOK NSW 2333 TEL: (02) 6542 4432 FAX: (02) 6543 4164
 EMAIL: MARK.SANDERS@DIPNR.NSW.GOV.AU WEB: WWW.HCR.CMA.NSW.GOV.AU/UHRRI