# High Country Urban Biodiversity Project

## Final Report

Prepared for the NSW Environmental Trust

June 2012

NSW GOVERNMENT | NSW Environmental TRUST

High Country | Urban Biodiversity Project

Final Report

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2012

# PROJECT: HICUB: HIGH COUNTRY URBAN BIODIVERSITY

(Biodiversity in High Country Urban Communities)

REFERENCE NUMBER: 2008/USM/0023

GRANTEE: Armidale Dumaresq Council (Auspicing Council), Guyra Shire Council, Uralla Shire Council and Walcha Council.

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## ABBREVIATIONS

| | |
|---|---|
| ACBC | Armidale City Bowling Club |
| ADC | Armidale Dumaresq Council |
| ATG | Armidale Tree Group |
| AURG | Armidale Urban Rivercare Group |
| BLLG | Ben Lomond Landcare Group |
| BRGCMA | Border Rivers Catchment Management Authority |
| CSO | Community Support Officer |
| CWC | Citizens Wildlife Corridors |
| DPI | (NSW) Department of Primary Industries |
| EASTLECC | East Armidale Sustainable Living Education and Community Centre |
| EEC | Endangered Ecological Community |
| ELA | EcoLogical Australia |
| EPBC | Environment Protection and Biodiversity Conservation Act, 1999 |
| FMS | Facilities and Management Services, University of New England |
| GSC | Guyra Shire Council |
| HiCUB | High Country Urban Biodiversity Project |
| LGHM | Lawns, Gardens, Home Maintenance contractor |
| LHPA | Livestock Health and Pest Authority |
| MoD | Mother of Ducks (Lagoon) |
| NEGS | New England Girls School |
| NERAM | New England Regional Art Museum |
| NESS | New England Sustainability Strategy |
| NEWA | New England Weeds Authority |
| NRCMA | Northern Rivers Catchment Management Authority |
| OEH | (NSW) Office of Environment and Heritage |
| PAH | Polycyclic aromatic hydrocarbons |
| PLC | Presbyterian Ladies College (Pymble and Armidale) |
| RIRDC | Rural Industries Research and Development Corporation |
| SCS | Soil Conservation Service |
| SLA | Sustainable Living Armidale |
| SLEX | Sustainable Living Expo |
| SNEL | Southern New England Landcare |
| SNELCC | Southern New England Landcare Coordinating Committee |
| TAFE | NSW Department of Education and Training Technical and Further Education |
| TAS | The Armidale School |
| UNE | University of New England |
| USC | Uralla Shire Council |
| WC | Walcha Council |

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# HIGH COUNTRY URBAN BIODIVERSITY PROJECT SUMMARY

The High Country Urban Biodiversity project (HiCUB) was the largest urban environmental project undertaken on the Northern Tablelands. Four Councils - Walcha, Uralla, Armidale-Dumaresq and Guyra - contracted Southern New England Landcare (SNEL) to deliver the project in the urban towns and villages of Walcha, Uralla, Kentucky, Armidale, Ebor, Guyra and Ben Lomond between 2009 and 2012. This unique Council-Community partnership delivered significant on-ground works, engaged broad sections of the community and build trust and capacity among Councils, community organisations and the broader communities.

This report provides a picture of what the HiCUB project achieved, although the diversity and complexity of the project prevents a full record of everything that happened. The written report is supplemented by a video documentary, made in the last 10 months of the project, to provide a different medium for reporting on the project. This final report is also supplemented by previous reports submitted to the NSW Environmental Trust, particularly the Progress Report (December, 2010).

The project was established in 2008-09 by a large group of stakeholders through the project application stage and then through the development of the Business Plan. The Business Plan and Program Logic (Appendix 1a and 1b) set out five objectives and 18 outcomes for the project. The following section summarises how HiCUB achieved the five objectives.

1) **Improve the ecological health of urban riparian lands and bush lands including Ecologically Endangered Communities: reduce weeds; increase in area and quality of native vegetation; erosion remediation; and improve habitat linkages at landscape scale.**

   On-ground works were conducted at numerous sites in riparian zones, urban bushland, community parkland and peri-urban lands. These works included major in-stream erosion control and sediment interception works; bush regeneration; large-scale revegetation; and development of plans for conservation and management. Works were carried out by Councils, contractors and by volunteers and community organisations. On-ground projects include at least one highly visible site in each local government area. The works include:

- Major riparian earthworks, fencing and revegetation in Urandangie Creek to reduce the amount of sediment and nutrient reaching Malpas Dam, the main water supply for Armidale.
- The re-establishment of large areas of native vegetation, erosion control and weed removal on the Dumaresq Creek banks and floodplain right through the urban area of Armidale.
- Major rock revetments, erosion control, weed removal and revegetation in the two urban creeks in Uralla to prevent erosion and improve habitat for aquatic wildlife, particularly the Native Water Rat and Platypus.
- Major channel re-shaping, rock riffle construction and revegetation in the Apsley River in Walcha.
- Significant weed removal and bush regeneration in significant urban remnants of the Threatened Ecological Community, *Ribbon Gum-Snow Gum-Mountain Gum Grassy Woodland of the New England Tableland* in Armidale, Guyra and Walcha.
- Significant weed removal and bush regeneration of other vegetation communities in Uralla and Armidale.
- Willow removal, weed control and revegetation of smaller urban creeks in Armidale.
- Urban plantings of local native species in the towns of Guyra, Ebor and Ben Lomond.
- Protection of Sphagnum Bog by fencing to exclude cattle in the township of Ebor.
- Laying new pipes in Guyra to ensure that stormwater from high intensity rainfall events reaches the impounded section of Mother of Ducks lagoon; an EPBC-listed *Upland Wetland of the New England Tablelands (and Monaro Plateau)*.
- Establishment of a firewood/biofuel demonstration planting at the Waste Transfer Centre in Armidale.

2) **Improve the effectiveness of councils and community effort toward environmental rehabilitation through improved integration, collaboration and greater knowledge transfer between councils and stakeholders.**

Perhaps the most significant outcome of the HiCUB project has been the increase in collaboration between the various sustainability stakeholders on the Northern Tablelands. The level of cooperation between Councils and community organisations has greatly increased, built on mutual understanding and trust. The relationship between SNEL and each of the councils has improved because each organisation understands better what the strengths and weaknesses of the other are. This partnership will continue as SNEL has ongoing partnerships with each of the project Councils.

With SNEL as an intermediary, councils have been better able to work with community groups. Groups have been able to make better use of council resources (e.g. rock, mulch, advice) by knowing which resources are readily available and which are difficult for council to share.

Another significant relationship to come out of HiCUB has been that between the University of New England and community organisations and Council. UNE is the owner of a large parcel of land in Armidale, with Dumaresq Creek running for 2 km through the campus. Through the efforts of the UNE Landcare Group, the Armidale Urban Rivercare Group (AURG) and HiCUB staff, Facilities and Management Services (FMS) at UNE have adopted plans for management of bushland areas on campus and have approved and assisted with willow removal and revegetation works on the creek. Council provided mulch and accepted green waste for free from the campus. Recently, FMS has engaged SNEL and AURG to manage a large willow removal project on the creek funded by an insurance payout from recent flood damage. The University has actively proclaimed this partnership project as an example of its growing sustainability credentials.

HiCUB also fostered cooperation among existing community groups, most notably in Armidale. The Armidale Tree Group, Sustainable Living Armidale, Armidale Urban Rivercare Group, UNE Landcare and Friends of Black Gully have all cooperated on different projects, learning from each other in the process. There have been many opportunities to share tools and methods.

3) **Monitor, evaluate and implement improvement in approaches to rehabilitation of urban areas**

The HiCUB project invested 10% of the project budget into monitoring and evaluation. The aims of M&E for the project were to:

1. Be accountable to the NSW Environmental Trust and other project participants and stakeholders,
2. Evaluate the success of the project against its stated objectives and outcomes,
3. Learn from the activities and methods of HiCUB to ensure continuous improvement during and after the project, and
4. Provide baseline data for future projects and monitoring.

To achieve these aims HiCUB used a number of approaches:

- Contracting Eco Logical Australia (ELA) to carry out a specific program of monitoring and evaluation across the whole project. This included biophysical monitoring of water quality, weed control and revegetation success as well as social monitoring. Their report and evaluation can be found in the ‘Monitoring and Evaluation’ chapter and in the project appendices.
- Using local contractors and volunteers, particularly through the Technical Advisory Committee, to carry out monitoring of flora and fauna in urban bushland remnants,
- Supporting an Honours student to look at PAH and heavy metal contamination in Dumaresq Creek in Armidale,

- A major video documentary project covering the final 10 months of the project captured works in action, interviews with project stakeholders and participants and community events,
- 'Woodlands Week' – a series of educational events across the project which also engaged the community in observing and monitoring fauna and flora in urban bushland.

Informal monitoring and adaptation methods were used throughout the project. HiCUB staff worked closely with community groups to trial new and innovative methods and to reassess project priorities. New methods which were tested and adopted included: seed balls; use of Hamilton planters; different planting densities; different species mixes; use of flail mulchers for woody weed control; cut-paint-and-mulch method for broom control; use of jute mat in place of mulch; Chinese wormwood control methods; use of StormPro pipe for low cost drainage; and shallow pond construction techniques for riparian improvement. Proven methods for revegetation, bush regeneration, willow control and woody weed control were also shared among people and groups previously unfamiliar with them.

Constant monitoring also enabled project sites to be re-prioritised as new information came to hand. This lead to new rock revetment works in Armidale and Uralla after heavy rainfall increased the erosion at these sites.

**4) Increase long-term participation in urban ecosystem rehabilitation targeting community volunteerism and investment from private and government sources**

During the life of the project, the HiCUB team worked very hard on increasing community understanding of the HiCUB project aims and to get as many people involved as possible. During the life of the HiCUB project this was achieved through:

1. A strategic and broad communication program using news media, the HiCUB website, a regular email newsletter, targeted emails, talks and lectures, social media, stickers, posters, community notice boards and personal invitations.
2. A high number of community events such as working bees, field days, training courses, workshops, concerts and expositions.
3. Opportunities for participation in project planning through community consultation events, town working groups, the Advisory Committee, the Technical Advisory Committee and the Steering Committee.
4. Engagement of local businesses through a site sponsorship program, talks to Chambers of Commerce and Service Clubs, and tender and quoting processes.

The active recruitment and involvement of the community led to a greater understanding of the value of urban biodiversity and of the impact that people have on it – both positive and negative. We believe that this will lead to positive changes in behaviour and a greater level of support for local government projects which protect this biodiversity.

The number of people volunteering for sustainability projects increased and it is likely that some of these people will continue to volunteer with existing groups in the towns, or that new environmental projects will be actively supported.

The capacity of the community has greatly increased directly as a result of HiCUB. There are many new tools, skills, methods and resources available to existing community groups and to councils to continue the work of HiCUB. HiCUB continued over 40 years of environmental work in the region but was able to make a significant surge in capacity and in community understanding of urban biodiversity.

HiCUB has also increased the capacity of councils and community groups to attract new investment into urban biodiversity. As a direct result of HiCUB processes and staff time, significant new projects have been funded from State and Federal Government programs. These projects will continue some of the projects commenced by HiCUB. A cross-regional project, *New England Regeneration* (See appendix 2c), was developed by Southern New England Landcare, with a vision to increase connectivity from the North West Plains across large climatic and altitudinal gradients to the Great Eastern Escarpment. This project provides a coordinated vehicle to attract government and philanthropic investment. In the recent Australian Government Biodiversity Fund round, the *New*

*England Regeneration* project attracted funding of $2.3 million for the western portion of the corridor and $65,000 on the Northern Tablelands for local projects.

5) **Improve resource use efficiency - increase utilization of council mulch; increase uptake of rebates for rainwater tanks, and alternative energy technology; decrease nutrient load in town water supply.**
    - The HiCUB project directly used over 1000$m^3$ of council mulch in Armidale and 300$m^3$ in the other towns, and stimulated community use of mulch to such an extent that the supply was exhausted 3 times.
    - As explained in the 'Modifications' chapter, when HiCUB commenced there were several other projects and programs running that specifically aimed to promote uptake of rebates for rainwater tanks and alternative technology. These included the New England Sustainability Strategy (NESS), the 'Farming the Sun' project and 'New England Wind'. Rather than duplicate these projects, HiCUB actively supported them by participating in the management of the projects and in promoting their aims. These projects significantly increased uptake of alternative energy and rainwater tanks.
    - HiCUB assisted Armidale Tree Group to install a windmill to reduce town water use and to pump from a stormwater dam without additional energy costs.
    - HiCUB led a research project looking at pellet heaters as a means to replace wood heaters for domestic space heating, with a subsequent reduction in wood smoke pollution and impacts on biodiversity from firewood harvesting. This included the establishment of a demonstration planting of local species for firewood or biofuel.
    - The major project under this objective was the riparian works in Urandangie Creek. This project built rock flumes, a low flow dam, and rock revetments; fenced 3km of creek; built off-stream stock watering systems and revegetated the creek banks. Urandangie Creek is one of the main sources of water for Malpas Dam – the drinking water supply for Armidale. The works will intercept nutrients and sediment coming from Guyra township and surrounding farmland and help reduce the regular outbreaks of Blue Green algae which require expensive chemical treatment.

# BACKGROUND & PROJECT OBJECTIVES

## PROJECT BACKGROUND

The needs assessment for this project included broad stakeholder and key informant consultation.
This project addressed the degradation of riparian and urban bushland and the fragmented network of responses by institutional and community players, and urban use of waste, water and energy. The specific issues addressed were:

- Fragmentation of habitat including urban remnants of two endangered ecological community in Armidale (Ribbon Gum-Mountain Gum-Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion and Box-Gum Grassy Woodlands) and Koala habitat.
- Environmental weeds,
- Lack of native riparian vegetation,
- Erosion of urban creek banks,
- Damaging nutrient load entering water supply catchment,
- Degradation of water ways entering the world heritage areas of Oxley Wild Rivers National Park (20km downstream of Walcha town),
- Unsustainable use of resources (rainwater, energy, waste) & poor uptake of community/residential rebates.

Fragmentation of community effort – We have significant resources, community willingness, established groups, native nurseries, the University, etc. but efforts have been disparate and lacking support and evaluation.
The gaps in knowledge addressed by this project include both instances where no knowledge exists and instances where knowledge is not accessible to the key people such as council staff and community. Through biophysical and social survey work and education activities, the following knowledge gaps were be addressed by this project:

- Evaluation of restoration efforts of community groups, councils and other land managers in riparian and woodland areas,
- River restoration options and recommendations, particularly for the Apsley River in Walcha,
- Biodiversity surveys and management recommendations in urban bushlands across the four local government areas including the following information:
    - Prioritisation of conservation value of habitat areas that are potentially under threat from urban development to inform planning by local government and landowners
    - Identify areas that are potentially remnants of Endangered Ecological Communities warranting management support through this project
    - Key habitat and corridor mapping at the urban scale,
    - Classification of areas into management zones to inform regeneration work requirements and priorities,
    - Community use and values relating to urban bushland to inform community engagement.
- Impediments to community uptake of sustainable resource use.

## PROJECT OBJECTIVES

1) Improve the ecological health of urban riparian lands and bush lands including Ecologically Endangered Communities: reduce weeds; increase in area and quality of native vegetation; erosion remediation; and improve habitat linkages at landscape scale.
2) Improve the effectiveness of councils and community effort toward environmental rehabilitation through improved integration, collaboration and greater knowledge transfer between councils and stakeholders.
3) Monitor, evaluate and implement improvement in approaches to rehabilitation of urban areas
4) Increase long-term participation in urban ecosystem rehabilitation targeting community volunteerism and investment from private and government sources
5) Improve resource use efficiency - increase utilization of council mulch; increase uptake of rebates for rainwater tanks, and alternative energy technology; decrease nutrient load in town water supply.

## PROJECT OUTCOMES

Listed below are the ultimate outcomes anticipated for the project.
(The numbers in parenthesis indicate the related Project Objective, section 2.2.5)

The ecological health of urban riparian lands maintained and improved (1)

a) The ecological health of urban bushlands maintain and improved (1)
b) The area of functional riparian land and habitat corridor increased (1)
c) Effective council /stakeholder collaboration on environmental rehabilitation through shared planning, training and monitoring processes and cooperative work (1, 2, 3, 4)
d) Project governance structures that develop mechanisms to encourage project activities that will be sustained beyond project lifetime (2,4)
e) A future funding mechanism established and investment partnerships developed to fund the continuation of project works (2, 4)
f) Council zoning and development decision processes informed by technically robust biodiversity management plans and stream restoration plans, with community input (1, 2)
g) Community group and council activities guided by technically robust biodiversity management plans and stream restoration plans (1, 2, 3)
h) Knowledge and skills developed and shared on the effectiveness of rehabilitation techniques for urban riparian lands and bush lands to inform plans and ongoing management (1, 2, 3, 4)
i) Increased capacity of the urban community to manage natural resources (1, 2, 3, 4, 5)
j) Participation in urban sustainability activities increased across the broader community and schools (1, 2, 3, 4, 5)
k) Increased awareness, understanding and ownership among residents of the natural areas within the towns (1, 2, 4)
l) Increased awareness and understanding of the impacts of our resource use (5)
m) Decreased unsustainable resource use; increased utilisation of council mulch, increase uptake of rebates for rainwater tanks, and alternative energy technology (5)
n) Implementation of innovative mechanisms developed by community groups to achieve more sustainable use of resources. (5)
o) Increased community engagement in mechanisms to achieve increased sustainable resource use. (5)
p) Improved ecological function, specifically nutrient filtration of one or more of the tributary streams entering town water supply. (5)
**q)** Increased landholder engagement and support in project activities on private land. (1, 5)

# PROJECT ACTIVITIES

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## ARMIDALE

Armidale is the largest town in the project with a population >22,000. The town is home to the main campus of the University of New England. The Armidale community is very active in sustainability and environmental conservation. Many community organisations participated in HiCUB, contributing thousands of hours of volunteer time and resources. Armidale Dumaresq Council played an active and significant role in the project.

The major project in Armidale was the ‘Dumaresq Creek Riparian Works’. This is a highly visible project with many thousands of trees and shrubs planted along the creeklands, interpretive signage, bush regeneration, willow removal and rock revetment. The creeklands are used by many residents for recreation and the project has significantly improved the amenity of the creek. Over time the plantings will provide food and shelter for the wildlife that uses the creek as a corridor.

Another significant outcome in Armidale has been the increased collaboration between Council, community organisations and contractors. The relationship between the Council and Southern New England Landcare has been strengthened after both organisations were able to learn the strengths of the other. The membership and capacity of several community groups have increased as a result of the project so they will be able to continue expanding the work started by the HiCUB project.

The results of the Monitoring and Evaluation of a selection of Armidale projects are reported in Appendix 5d and 5e.

## ARMIDALE TREE GROUP DAM SPILLWAY

Summary: *met outcomes a, c, d, e, h, i, l, q*

See appendix 2a.

Armidale Tree Group installed a spillway from the Black Gully Dam that will allow for large rainfall events. Initially completed in August 2011, the structure failed due to extremely high rainfall in November causing the partial collapse of the spillway. This rainfall saw Armidale-Dumaresq listed as a natural disaster zone. Soil Conservation Service re-engineered the spillway to include a wider flume, larger rocks and a concrete cut off trench. Stepping stones were also incorporated across the spillway for recreational access.

The area around the spillway has now been revegetated with approximately 200 native species and hand sown with native grass species. This was done as a part of ATG's grassland restoration trials, funded by Caring for Our Country.

***Students at the RoundSquare Conference 2012 take a tour of the Mike O'Keeffe Woodland and the spillway behind the Armidale Tree Group.***

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| *Outcomes from on-ground works* | • Over 200 native seedlings established, as well as grasses<br>• 3000m$^2$ weed control<br>• 1000m$^2$ revegetated<br>• Improved water quality from Black Gully into Dumaresq Ck |
| *Outcomes from community events* | • 2 community open days, using the windmill as a demonstration with 210 visitors<br>• Volunteer planting with 9 volunteers |
| *Project partners* | • Armidale Tree Group<br>• Highland Quarries Guyra<br>• PJ & CM Ducat Pty Ltd<br>• Soil Conservation Services<br>• Field's Tree Planting Services |

## ARMIDALE TREE GROUP WINDMILL

Summary: *met outcomes h, j, k, m, n, o*

See appendix 2b.

Armidale Tree Group installed a windmill to pump water from Black Gully Dam for the purpose of irrigating their native plant nursery. Chosen as a clean, low maintenance method for extracting water from the dam to a holding tank for daily irrigation of the nursery, the windmill has helped the nursery reduce their mains water consumption. The windmill has reduced ATG's quarterly water bill from $780 to $28. Many of the plants used by the HiCUB project have been sourced from the Armidale Tree Group nursery.

In addition to the support from HiCUB with the windmill, ATG has taken the initiative to install a 3kw solar power unit. This means that the nursery has not only reduced their costs, but also their carbon footprint. The windmill also serves as a reminder that wind power is readily available for reducing energy use on this type of project.

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| *Outcomes from on-ground works* | • Savings of 1750KL of water from mains<br>• Wind power used to replace a petrol pump |
| *Outcomes from community events* | • 2 community open days, using the windmill as a demonstration with 210 visitors<br>• 1 media article |
| *Project partners* | • Armidale Tree Group<br>• C & C Hibberd |

## BIRDS, BERRIES AND BUSH

Summary: *met outcomes b, d, i, l o*
See appendix 2c.

A large hedge (400 x 10m) of predominantly Firethorn (*Pyracantha angustifolium*) was removed from an urban park. The hedge was adjacent to a remnant bushland area containing Threatened Ecological Communities (Box Gum Grassy Woodland and Ribbon Gum-Snow Gum-Mountain Gum Grassy Woodland) and the berries were being spread into the remnant by Currawongs and other birds. Berries provide a significant winter food source for the larger, more aggressive birds like Currawongs, and for foxes. Currawongs threaten smaller native birds, disrupt their breeding and rob their nests in spring, contributing to the decline of several species.

Removal of the hedge by cutting would have left an enormous green waste pile which could not be disposed of at the tip (not enough space), by chipping (too thorny to handle) or by burning (too much smoke in town).

After a call for quotes, a contractor was selected who removed the hedge using a flail mulcher. This reduced the hedge to mulch on site, thus reducing regrowth from seed and preventing erosion. The site has been re-sprayed twice and will be planted out in spring 2012 with more appropriate native species by Armidale Dumaresq Council.

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| *Outcomes from on-ground works* | • 4000 $m^2$ of environmental weeds removed<br>• New effective technique trialled and demonstrated for removal of concentrated environmental weeds |
| *Outcomes from community events* | • No objections from community after letterboxing all neighbours.<br>• 1 media article in 'The Independent'<br>• Council to continue project and maintain site |
| *Project partners* | • Alex Cunningham (contractor)<br>• Armidale Dumaresq Council<br>• Armidale Tree Group<br>• New England Weeds Authority |

## BLACK GULLY

*Summary: met outcomes a, c, d, e, h, i, j, l*

See appendix 2d.

Black Gully is a second order stream that feeds into Dumaresq Creek Armidale. Following clearing in the 1800s and early twentieth century the gully was planted with willows at the spacing of one per 10 metres in the 1930s. Up until the 1980s the gully and surrounding area was maintained to a high park like standard. Change of ownership and other factors contributed to the gully becoming overrun by weeds such as Montpellier broom, privet, honeysuckle, poplars, blackberry and an emerging serious weed, box elder. At times the gully experiences high velocity flows from heavy rain causing moderate erosion of the stream bed.

Friends of New England Regional Art Museum (NERAM) situated near Black Gully asked for assistance from HiCUB in developing a project to rehabilitate the creek and beautify the area near the museum as they were developing their own landscaping plan for the grounds. A number of attempts at rehabilitating the gully had been made over the years by groups such as GreenCorps.

After meetings with landholders which included University of New England (UNE), Armidale Dumaresq Council (ADC) and Land and Property Management Authority a plan was developed for the removal of willows and the establishment of a number of native plantings. An interest group was also formed called Friends of Black Gully.

The Gully was so badly infested with weeds that New England Weeds Authority carried out two initial chemical control applications on Honeysuckle and other woody weeds. This allowed access to willows and also ease of movement for Jobs Australia crew members to follow up with more intensive cutting and painting and hand removal of weeds. Over a 16 month period four working bees were held with Friends of Black Gully and nearby residents and one with international students from UNE, establishing over 1200 seedlings. Fourteen willows were removed from the creek by tractor and chain.



Most woody material removed was chipped on site for use on plantings at the site. The remaining large material was removed by ADC. Jobs Australia crew members contributed over 200 hours of work weeding, brushcutting, mowing and chipping on this site and without their contribution progress on the gully would have been severely hampered.

The end result is far better than expected with all willows removed from the creek, most woody weeds under control, three planting areas established and ongoing management planned for the gully with the first planting day beyond HiCUB being National Tree Day 2012 in July. A design for a small weir and stream bank modification was drawn up and Armidale Dumaresq Council plans to carry out the works soon.

As a feature event for the end of HiCUB activities a free family fun day in the form of a music festival was held in the Black Gully surrounds. The Black Gully Music festival was supported with live music from local bands, food, tree planting activities, face painting and a display of HiCUB achievements. Sustainable Living Armidale (SLA) has established a community vegetable garden in an old tennis court adjacent to Black Gully. HiCUB assisted by providing tools and promoting the garden.

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| *Outcomes from on-ground works* | • 14 Willows removed from 350 m reach of creek<br>• 2500m² riparian weeds controlled<br>• 700m² area planted<br>• 600m² area prepared for National Tree Day winter planting 2012<br>• 1.8 seedlings per m²<br>• 95% survival<br>• Renovated old stage and open air venue area<br>• Site management plan |
| *Outcomes from community events* | • 6 working bees<br>• 60 people involved<br>• Inaugural Black Gully Music Festival<br>• 2 media articles<br>• Input to Community Plan for Newling Precinct, including Black Gully<br>• Willow stumps used in NERAM art tutorial and TAFE chainsaw training<br>• 180 school students using project as educational excursion.<br>• Hand tools provided to Community Garden<br>• Mulch rakes donated to HiCUB from NERAM member<br>• $16,000 combined In-Kind contribution |
| *Project partners* | • New England Regional Art Museum<br>• University of New England<br>• Armidale Tree Group<br>• New England Weeds Authority<br>• Armidale Dumaresq Council<br>• NSW Land & Property Management Authority<br>• Armidale Urban Rivercare Group<br>• Jobs Australia<br>• Sustainable Living Armidale |

## BROOM SWEEP

Summary: *met outcomes b, d, h, i, j, k, l, n, o*

See appendix 2e.

Cape or Montpellier broom is a shrubby weed which has invaded part of Snow Gums Bushland Reserve, Manna Gums Reserve and other bushland patches throughout Armidale. These patches are spreading and will potential spread to other high conservation value vegetation including Oxley Wild Rivers National Park. By 2010, despite the constant efforts of volunteers, the broom had taken over 1.5ha of the Snow Gums Reserve on a very prominent corner. HiCUB technical advisory group discussed a number of ways to tackle the problem, and developed a management plan for the site. The method agreed on for control was to use a combination of cut-and-paint with herbicide, long-term mowing and deep mulching, with follow-up sprays of the site for two years after initial treatment.

After calling for quotes a contractor (LGHM) removed as much broom as was accessible and painted the stumps with glyphosate. Volunteer teams also worked on particularly sensitive sites or areas with isolated plants. This removed the bulk of the biomass before seed set in spring. All material was mulched and left on site. To prevent re-germination, the open areas of the site were mulched with green waste mulch supplied by Council. New England Weeds Authority sprayed the site in autumn 2012 and will continue to spray the site for another 2 years. Parts of the site will now be mowed to prevent regeneration from seed. The process of removing broom from this site also removed Chinese wormwood, blackberry, privet, elm and Chinese pistachio. Volunteers and another contractor also removed significant outbreaks of broom from Manna Gums, Black Gully and other bushland areas. NEWA spot sprayed isolated outbreaks throughout the urban area of Armidale.

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| *Outcomes from on-ground works* | • 5ha of Montpellier broom removed from urban bushland and new outbreaks controlled throughout town.<br>• Urban bushland made manageable for bush regeneration volunteers.<br>• New techniques for large-scale weed control demonstrated (new business for contractor). |
| *Outcomes from community events* | • Highly visible site with significant improvement and community access.<br>• 3 media articles<br>• 180 school students working on site to follow up.<br>• 2 community working bees. |
| *Project partners* | • Armidale Tree Group volunteers,<br>• LGHM (contractors),<br>• New England Weeds Authority,<br>• Releaf Vegetation Management Services<br>• Armidale Dumaresq Council (mulch and green waste removal) |

## BUSH REGENERATION

Summary: *met outcomes b, d, h, j, k, l, n*

See appendix 2f.

***Before and after: blackberry removal in Snow Gums Bushland Reserve***

Armidale Tree Group members and other volunteers have been doing bushland regeneration in Snow Gums Bushland Reserve and Drummond Park for about a decade and publicising an annual “Wildflower Walk”. HiCUB staff provided support to promote and provide assistance at some of the regular working bees. The Freeman House drug and alcohol rehabilitation program started assisting with bush regeneration at the same time. This project augmented the ongoing volunteer work and HiCUB staff work by contracting Armidale Tree Group (ATG) to undertake additional work, particularly bushland regeneration that required significant skills such as identification and selective control of grass weeds, planning and supervising track making or improvements, plus provision of appropriate plants for revegetation or enhancement of selected degraded areas. ATG employed the person who co-ordinates the volunteer work to implement this contract. That involved 275 hours work in addition to her contribution as one of this project’s volunteers. A management plan for Snow Gums Bushland Reserve was developed jointly by the project officer and a HiCUB staff member. An Open Day was held as part of HiCUB’s “Woodlands Week” of educational events to encourage public appreciation of the work and the sites’ values.

HiCUB staff assisted with monthly volunteer working bees by providing publicity, signage and a barbecue. This resulted in an increase in the regular volunteers coming to other working bees. The work of this project and the ‘Birds, Berries and Bush’ and ‘Broom Sweep’ projects, made significant improvements to the ecological health of the most prominent urban bushland patch in Armidale.

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| *Outcomes from on-ground works* | • Area regenerated 10,000 $m^2$,<br>• Area weeded 19,400 $m^2$,<br>• Area from which pest species removed (foxes) 10,000 $m^2$,<br>• Target species (flora or fauna) for which habitat has improved - All indigenous flora (97+ spp.) and their dependent fauna to benefit – none specifically targeted. Added native shrubs to replace exotics as habitat for 21 birds and 1 wallaby,<br>• Area revegetated 425 $m^2$,<br>• Species diversity: Same 97 plus 4 extra plant species that occur in same community nearby. Same weeds (many reduced but none completely gone). Planting in former quarry included 11 extra species native to district as well as existing species.<br>• Plant survival 99%,<br>• Site coverage 0.4 plants/ $m^2$,<br>• Council removed weeds, |

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| *Outcomes from community events* | • 135 individuals engaged,<br>• Staff hours on project – ATG 275 hrs, HiCUB contractor 100 hrs,<br>• 96 volunteers giving 1100 hours,<br>• 20 student volunteers giving 51 hours,<br>• 135 people receiving on-the-job training in bush regeneration and plant ID, |
| *Project partners* | • 3 existing partnerships maintained and 2 new formed<br>• Armidale Tree Group,<br>• Armidale Dumaresq Council,<br>• Southern New England Landcare,<br>• Freeman House,<br>• Jobs Australia work crew,<br>• Round Square Conference,<br>• Presbyterian Ladies College,<br>• New England Weeds Authority |

## DUMARESQ CREEK RIPARIAN WORKS – STAGE 1 AND 2

Summary: *met outcomes a, c, d, e, f, h, i, j, k, l*

See appendix 2g.

**Armidale Major Project**

Carrying out well located works along the Dumaresq Creek that supported the efforts of Armidale Urban Rivercare Group (AURG) and provided new and interesting opportunities for others to participate in were the main goals of this project. The idea of “showcase plantings”, stepping stone plantings for wildlife that were both educational and visually very different from many previous plantings fitted well with these goals. They also provided a new angle of opportunity to include the local community in the establishment of plantings and also sponsorship. The works carried out under this project follow a 5km reach of the Dumaresq Creek in Armidale. A well-used pedestrian and bicycle path runs for most of this length.

**AURG** was established in 2001 with the objectives of re-establishing native vegetation along some sections of the creek and removing areas of woody weeds such as privet, willow and poplars. AURG is a very popular and dedicated group that holds regular working bees that attract between 30 - 50 community members. HiCUB formed an important relationship with AURG to advance shared aspirations and further ties with SNEL which had previously been providing support for AURG. HiCUB assisted AURG in the preparation and planting of 3 sites along Dumaresq Creek covering a total area of .3ha. AURG volunteers also assisted in the planting of Showcase sites 5 and 12. HiCUB negotiated a regular maintenance budget from Armidale Dumaresq Council which will enable all AURG planting sites and HiCUB sites to be maintained for a period of at least 5years. HiCUB also assisted AURG in applying for a successful grant of $44,200 under the federal governments Biodiversity Fund Round 1. This grant will help sustain the group’s efforts over the next 6 years.

***Armidale Urban Rivercare Group members take a break from planting in the rain***

**Showcase plantings** were initially established in 3 highly visible locations in Stage 1 of the project in late 2010. By the time these plantings were growing a prospectus was developed with the idea of involving local businesses and organisations. The sponsor could contribute cash for the planting costs and also be involved the actual planting. This idea was very appealing as it involved staff or members working together on a community project within easy reach with nothing to organise except to turn up. The potential sponsor could also view an established site which proved the early works were an invaluable aid in attracting potential investors. An additional ten sites were prepared over the winter of 2011 and following media releases and word of mouth, seven enthusiastic sponsors signed up to the project.

Throughout the spring and summer of 2011-2012 a series of planting working bees were held at sponsor’s convenience either during work hours, after work or on weekends. Sites were fully prepared with mulch, seedlings ready and all tools and equipment available for a quick and easy start. Refreshments were also provided by HiCUB. This was a very busy time for HiCUB staff with many other commitments scheduled for this period.

The Armidale City Bowling Club (ACBC) sponsored the largest site of 3600m² and this took three working bees and some contractor time to finish. The relationship that was fostered between the bowling club and HiCUB has been transferred to AURG. AURG will now help ACBC members in maintaining a link to the creek by assisting in providing sites to carry out further creek rehabilitation. Sports UNE, sponsors of Site 1, have agreed to maintain their site into the future. The sponsorship of showcase sites has given people an opportunity within or outside of work hours to contribute to the health of our local creek. The majority of people participated in this sort of activity for the first time.

All showcase plantings incorporate key elements in their design such as the use of local native plants in a mix of typically one or two contrasting or complimentary species. The most commonly used planting shape has been a circle of about 1000m². Several sites have been fenced with split posts and plain wire and all sites are signposted and numbered corresponding to a walk/cycle guide booklet which will be available at the local tourist information centre. The booklet contains information on plant species at each site.


As of June 2012 HiCUB plantings carried out along the creeklands have shown remarkable resilience and growth rates with over 90% plant survival. A number of *Lomandras* disappeared for a winter but re-emerged with a vengeance from a thick layer of mulch the next spring.  Grass species have self-seeded and the second generation of grasses has begun growing in at least two sites. The high level of planting success can be attributed to correct species selection, provision of local seed to nurseries for HiCUB plant stock, site maintenance and favourable seasons. Plantings were undertaken in all seasons including winter. Generally there has been little deliberate vandalism of plantings, some high use areas have had a number of bamboo stakes removed and cartons taken away but it is heartening to see others passing by repairing the damage.

The breadth of works and scale of activity that occurred over the one and a half year period of this project meant that HiCUB staff members were constantly on-site during the preparation and planting phase but also in the post planting maintenance period. This gave us the opportunity to interact with members of the local community and residents who were commuting or exercising along the creeklands. There were many opportunities for the local community to be involved in the physical works and many people came along for the first time. Seeing positive changes to the environment and being able to ask questions and comment on works to project staff has engendered a spirit of cooperation, goodwill and community. Building relations in this way has been one of the key successes of the project.

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| *Outcomes from on-ground works* | • 15000 seedlings established over 16000m²<br>• 0.93 plants per m²<br>• Plant survival above 90%<br>• Project spans 5km of Dumaresq Creek<br>• Previously untried plant species were successfully established<br>• On-going development of design principles and methods of establishing urban riparian plantings<br>• plantings successfully established during all seasons |
| *Outcomes from community events* | • 3 new on-going partnerships established<br>• 2 future funding sources secured<br>• 450 people engaged<br>• 19 working bees |

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| | • 5 media releases<br>• 3 articles in 'The Independent'<br>• In-kind contribution (materials & labour less mulch) $15,360<br>• 1200 m² mulch contributed $20,000<br>• Total in kind $35,360 |
| *Project partners* | • New England Weeds Authority<br>• Armidale Dumaresq Council<br>• Armidale Urban Rivercare Group<br>• O'Connor Catholic College<br>• Minimbah Public School<br>• Duval High School<br>• Armidale City Bowling Club<br>• Jobs Australia<br>• Armidale Tree Group<br>• Fields Native Nursery<br>• Kentucky Tree Nursery<br>• Cedar Nursery Nursery<br>• Moons Native Nursery<br>• Galbaan Healing Our Environment Group<br>• Sports UNE<br>• Greenscene Landscapes<br>• Terry Rhodes Bobcat<br>• Poss Earthmoving Uralla<br>• New England Solar<br>• Ecological Australia<br>• New England Mutual<br>• Dog Walkers and Recreationists of Dumaresq Creek |

## EASTLECC

Summary: *met outcomes a, c, d, o*

See appendix 2h.

**See also Regional project – EASTLECC.**

The EASTLECC project was a proposal to establish a regional sustainability centre on land acquired by The Armidale School. The site included degraded land

The site works included the establishment of a community vegetable garden facility for the Narwan Aboriginal village next door. Six raised garden beds were built and filled with quality soil and the Aboriginal community is using this for vegetable growing.

The site was cleaned up, after checking for contamination, by removing accumulated rubbish. A small population of Montpellier broom was sprayed by New England Weeds Authority.

Once the feasibility study for the Sustainability Centre recommended against establishing the centre at this site, the plans to revegetate the gully were abandoned. Instead, the money and seedlings allocated to this were re-directed to part of the Dumaresq Creek Riparian works. An area of the creeklands was prepared and planted in April 2012 as part of the Round Square conference. TAS and NEGS organised the conference, which brought 180 private school students from across Asia to Armidale for 5 days. These students planted over 2500 seedlings adjacent to the creek. The funding also enabled a major bush regeneration activity to be organised at Snow Gums Park and for an educational activity in Black Gully to be prepared and delivered.

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| *Outcomes from on-ground works* | • 2500 seedlings established over 400 $m^2$,<br>• 6 community vegetable garden beds established,<br>• 10,000 $m^2$ land cleaned up,<br>• 3000 $m^2$ weeded,<br>• 100% plant survival,<br>• 100m bank stabilisation through revegetation, |
| *Outcomes from community events* | • 180 school students worked for 6 hours each on community projects,<br>• Narwan Village participation in community garden,<br>• Rivercare volunteers led planting activity<br>• ATG volunteers involved in bush regeneration activity,<br>• 3 media releases/articles<br>• 4 community groups involved |
| *Project partners* | • The Armidale School,<br>• New England Girls School,<br>• Armidale Urban Rivercare Group,<br>• Galbaan Healing Our Environment,<br>• Armidale Tree Group,<br>• Armidale Dumaresq Council,<br>• Releaf Vegetation Services,<br>• Friends of Black Gully,<br>• Aboriginal Keeping Place<br>• Round Square |

## GALBAAN HEALING OUR ENVIRONMENT GROUP ARMIDALE

*Summary: met outcomes l, j, m*

See appendix 2i.

'Galbaan Inc.'- is an association which exists to help aboriginal people interested in community development, employment opportunities and environmental work. HiCUB's association with Galbaan began by a chance meeting with Galbaan's Dorothy Roberts and HiCUB Community Coordinator Brenda Shepherd. In June 2010 a business planning workshop was held with the intent of developing a business based primarily on the production of native wetland plants. HiCUB played a key role in the development of the idea of a wetland plants nursery with the mentorship of HiCUB Projects Manager Nic Cobcroft. Discussions and meetings with TAFE rural skills coordinator Arleen Packer led to the development of a training package that included horticulture and small business management.

Members of the group were highly enthusiastic and applied themselves to the difficult task of learning new techniques in wetland plant propagation and plant identification. The group was also contracted to help at various other HiCUB sites and carried out planting, bush regeneration and fencing.

Two workshops were held with members and their families to help them look at their domestic energy consumption and find ways to reduce it. Participants were very enthusiastic and reported significant savings in electricity consumption as a result of the 2 workshops.

Over almost two years there were a number of changes within the group as some found full time work and unfortunately health issues and the passing of a number of family members within a short space of time bore its toll on other key members. There are many important positives that have resulted from this project some cannot be explained, are intangible or personal however they include on-going relationships forged on many levels and self –development.

***Galbaan planting Showcase site 5***

***Clearing privet from Mt Mutton***

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| *Outcomes from on-ground works* | • Two study tours of local wetlands learning wetland ecosystem function, plant identification and harvesting seeds and propagation material from the wild<br>• Production of over 8000 local wetland plants for planting in HiCUB riparian restoration projects<br>• Display and stall at Armidale's SLEX<br>• Construction of a 4m boat made from discarded plastic bottles reclaimed from roadsides and creeks<br>• TAFE training horticulture and business studies<br>• 2 Sustainable living workshops |
| *Outcomes from community events* | • 35 people engaged<br>• 18 people trained in Horticulture Cert III and 8 in Business Management Cert IV,<br>• 25 people participated in sustainability training (covering energy audit and water usage),<br>5000 people at SLEX inspected Galbaan display, |
| *Project partners* | • TAFE NSW Rural Studies Centre Armidale,<br>• Southern New England Landcare |

## MARTIN'S GULLY

Summary: *met outcomes a, d, f, h*

See appendix 2j.

Martins Gully is an urban tributary of Dumaresq Creek which runs through rural land including the saleyards and town common, before entering the urban area. HiCUB convened a workshop for major land owners along the gully to develop a sub-catchment plan for the site. We were able to attract co-investment from the Northern Rivers CMA for this plan and then a further $20,000 from the CMA for its implementation. This will result in revegetation of a large area of the gully, fencing of land adjacent to the creek and removal of woody and grassy weeds from the sub-catchment.

After the project was developed, the Armidale Livestock Health and Pest Authority (LHPA) asked HiCUB for assistance to fence off an additional area in the town common. The area fenced will exclude cattle and sheep from two gullies which are eroding and depositing sediment and nutrient into the creek. The site will be revegetated under the NRCMA project. LHPA provided the labour to erect the fence while HiCUB provided materials.

HiCUB staff also provided seedlings and supervision for two plantings days in the grounds of NEGS, resulting in 600 seedlings being planted.

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| *Outcomes from on-ground works* | • 500m fencing,<br>• 3ha protected from erosion,<br>• 150m creek bank stabilised,<br>• 600 seedlings planted |
| *Outcomes from community events* | • Sub-catchment Management Plan developed and its implementation funded.<br>• 2 working bees with 60 students for 2 hours each.<br>• 5 New partnerships formed |
| *Project partners* | • Armidale office of LHPA,<br>• Martins Gully Primary School,<br>• New England Girls School,<br>• Armidale Golf Club,<br>• Armidale Saleyards,<br>• Armidale Dumaresq Council,<br>• Northern Rivers Catchment Management Authority,<br>• New England Weeds Authority |

## ROLOGAS ROCK REVETMENT

*Summary: met outcomes a, c, d, g, h, i, o*

See appendix 2g.

The last two years of the HiCUB project have seen higher than average rainfall in the area which exacerbated existing erosion problems in Dumaresq Creek in Armidale. The banks of the creek near Rologas playing fields have steep banks, which were eroding due to undercutting of the banks. Large volumes of sediment were deposited into the creek. The earliest HiCUB plantings (Nov 2009) were along this section of the creek and had grown to a height of >2m with high survival. The bank erosion was undercutting some of the plantings and shrubs were falling into the creek.

HiCUB engaged Red Frog Environmental Services to design a rock revetment project to stabilise the creek banks and prevent further erosion. Armidale Dumaresq Council participated in the project by preparing and submitting a Fisheries Permit application and assisting with design. ADC and HiCUB jointly funded the works, with ADC providing rock, trimming overhanging willows, providing a site supervisor and paying for the removal of a large sediment deposit. Rock revetment was placed at the toe of the bank along 120m of the north side of the creek and over 400m3 of sediment was removed. A shallow rock weir was placed in the creek to prevent a major drop in level and 3 large willows were removed from the middle of the stream. Seed balls, prepared by primary school students at SLEX 2011, were distributed through the rock works and a recent inspection showed that these are germinating well. Wetland plants grown by Galbaan have been planted on an exposed creek flat.

The project has resulted in much better water quality, improved aesthetics and more riparian vegetation in the most prominent part of the creek in town. There have been many favourable comments from residents about this work.

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| *Outcomes from on-ground works* | • 120m of bank stabilisation,<br>• 600m$^2$ of revegetation,<br>• 3 willows removed,<br>• 1 rock weir,<br>• New revegetation technique (seed balls) trialled and demonstrated |
| *Outcomes from community events* | • Effective collaboration between council and community,<br>• Favourable response from community |
| *Project partners* | • Armidale-Dumaresq Council<br>• Armidale Urban Rivercare Group<br>• Ducats Soil and Gravel,<br>• Red Frog Environmental Services,<br>• NSW Fisheries |

## UNE LANDCARE

*Summary: met outcomes a, b, c, d, h, i, n*

See appendix 2k.

There are a number of high quality bushland remnants on the University of New England (UNE) campus. Over the years, the UNE Landcare group has come and gone depending on the support available. To develop the relationship with UNE, HiCUB took the opportunity to reinvigorate the group by supporting riparian regeneration works, bush regeneration and plant identification activities. Major activities included weed control and revegetation along Dumaresq Ck and bush regeneration in a significant remnant of Ribbon Gum – Snow Gum – Mountain Gum Grassy Woodland.

HiCUB initially identified areas of high conservation value on campus and indicated threats and management options. This information will be incorporated into UNE's Strategic Plan for the campus.

A strong partnership has developed between the UNE Facilities Management Services (FMS) and UNE Landcare. UNE FMS has been incredibly supportive by preparing planting sites, removing green waste and maintaining planting sites. This partnership will continue in the future, with plans developed for the next stage of revegetation at Dumaresq Ck, and will also include the Armidale Urban Rivercare Group.

***Students attending a bush regeneration and plant identification workshop with university lecturers and OEH employees 2011.***

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| *Outcomes from on-ground works* | • 630 seedlings planted<br>• 220m3 mulch spread<br>• 600m2 riparian land revegetated<br>• 1000m2 weed control and removal |
| *Outcomes from community events* | • 3 bush regeneration activities with 82 volunteers<br>• 4 revegetation activities with 76 volunteers<br>• 2 plant identification workshops with 16 participants<br>• 4 UNE Talloires Committee meetings |
| *Project partners* | • UNE Facilities Management Services<br>• UNE Talloires Committee<br>• Armidale-Dumaresq Council<br>• UNE Department of Environment and Rural Science – Botany<br>• Office of Environment and Heritage<br>• Armidale Urban Rivercare Group<br>• PLC Pymble students |

## WASTE TRANSFER CENTRE PLANTING

*Summary: met outcomes b, d, i, n, o*

See appendix 2l.

Armidale's waste transfer centre is located on a large block of land on the south east edge of town. The eastern edge of the landfill site has an area of Box Gum Grassy Woodland and open paddocks with mostly exotic grasses. This project revegetated 18,000m$^2$ with a mix of local species and firewood species. Half the site was planted with seedlings while the other half was seeded using a direct seeder borrowed from the Border Rivers Gwydir CMA. Direct seeding has not been used in the area for over 15 years so it was an opportunity to re-introduce this technique.

The firewood species were planted to demonstrate that they can be successfully grown and potentially harvested for the production of wood pellets. A companion project to HiCUB has been looking at options for using pellet heaters to reduce biodiversity impacts from firewood harvesting and to reduce wood smoke from conventional wood heaters. The trial will provide information to support this process in the long term.

The seeding was successful, with a high density of seedlings of a range of species germinating within one month of sowing.

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| *Outcomes from on-ground works* | • 420 seedlings planted,<br>• 1200m direct seeding,<br>• 18,000 m$^2$ revegetated,<br>• 8 firewood species sown or planted, |
| *Outcomes from community events* | • Highly visible site<br>• Engagement of Waste Transfer Centre staff in project preparation and maintenance<br>• One media release |
| *Project partners* | • Armidale-Dumaresq Council<br>• Armidale Tree Group<br>• Border Rivers Gwydir CMA,<br>• Rural Industries Research and Development Corporation,<br>• Sustainable Living Armidale |

# GUYRA

## Summary:

Guyra Shire projects included bush regeneration, urban plantings, walking tracks and a major riparian works project. Projects occurred in the urban areas of Guyra, Ben Lomond and Ebor and in rural areas adjacent to Guyra. The major project was the Urandangie Creek works, which aims to reduce sediment and nutrients entering Malpas Dam, the major water supply for Armidale. While entirely on rural land, this project will have a major impact on the urban population of Armidale. It included a substantial contribution from the land owners, Bill and Jacqui Perottet. The project also represents an accessible example of large scale revegetation and creek rehabilitation for the area.

Guyra is a small town on top of the Great Dividing Range. It does not have any existing environmental groups but has a strong ethic of looking after the town. We initially tried to stimulate interest in forming a bushcare group, but ended up having most success by working with existing community organisations, particularly the Guyra Bowling Club, Rotary and the schools.

Guyra has a significant remnant of Ribbon Gum-Snow Gum – Mountain Gum Grassy Woodland on the edge of town, and HiCUB ran many community and educational activities in this remnant. The site has 4 threatened plant species. A biodiversity walking track will lead visitors from the tourist information centre to this remnant and then on to the nationally-significant Mother of Ducks Lagoon (an upland wetland). We were able to improve the condition of the lagoon by improving stormwater flow from holding dams into the lagoon, rather than allowing it to be diverted away from the lagoon. In dry years this will provide a significant increase in lagoon water levels and in wet years it will save the local golf course from becoming a swamp.

The Ben Lomond community embraced the HiCUB project and have developed a guided walking track to the top of ‘The Brothers’ in town with interpretive signage along the way. Revegetation works have also improved the environment at the base of this walk. Ben Lomond residents were enthusiastic participants in Woodlands Week activities.

In Ebor, the community fenced out a Sphagnum Bog of high conservation significance, protecting it from travelling stock. A planting has increased the species and structural diversity on the town common.

The results of the Monitoring and Evaluation of a selection of Guyra projects are presented in Appendix 5g.

## EBOR

### Summary:

See appendix 2m.

The Ebor Village Link will benefit from assistance with fencing the Gerrard Ck wetland, plantings in the Ebor Conservation and Recreation Reserve and fencing two areas of the NSW EEC Montane Peatlands and Swamps of the New. England Tableland. One area is in the village and the other on the southern side of the Guy Fawkes River. The HiCUB team also provided technical advice on these and other projects the group is working on.

The wetlands in Gerrard Ck filter water running off Ebor township and intercept nutrients and sediment before it reaches Guy Fawkes NP. The project will significantly improve the Threatened Ecological Communities in the town. Two small plantings will increase connectivity and habitat value within the Conservation and Recreation Reserve.

Travelling stock and stock used in the annual campdrafts have for the first time in 40 years moved through the village without damaging the Peatlands. Shortly after the site was fenced, a large mob of cattle moved through the area. The impact of their hooves on the wet ground can be seen in the photo below. The excluded area containing the sphagnum bog was saved from this damage by the installation of the fence.

**Newly-installed fence showing protected area on the right and the impacts from travelling stock on the left.**

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| *Outcomes from on-ground works* | • 6**000m²** area fenced from stock<br>• **500 Seedlings** planted in Town Common<br>• 0.5 plants per m²<br>• 2 areas of Upland Peat & Swamp EEC fenced from stock<br>• 550m fencing & 3 gates |
| *Outcomes from community events* | • 8 members of Ebor Village Link participated in 3 working bees<br>• technical advice for plan by HiCUB |
| *Project partners* | • Ebor Village Link<br>• Guyra Shire Council<br>• Armidale Dumaresq Council<br>• LHPA<br>• Armidale Tree Group |

**Guyra Major Project**

*met outcomes a, c, d, h, i, p, q, r*
See appendix 2n.

***Mike Lloyd surveys Urandangie Creek***

Prior to HiCUB Urandangie Creek had been identified as a major contributor to sediment and nutrient loads entering Malpas Dam, Armidale's main water supply. The Urandangie Creek Rehabilitation project was aimed at improving the quality of water discharging into Malpas Dam, increasing the health and extent of the riparian community and providing an example of creek rehabilitation that could be further monitored and accessible to the community to view.

Following initial site visits and discussions a consultant Mike Lloyd of Red Frog Environmental Solutions was chosen by tender to develop a plan of management for the catchment of Urandangie Creek on the property of Urandangie. Field work was hampered by the La Niña influenced weather pattern causing many delays because of the wet. The Urandangie Water Quality Enhancement Technical Plan was finally available in Jan 2011. Mike produced a plan that enabled us to easily choose which work we would undertake from 3 levels of priority.

Preparations began in autumn 2011 along the creek for extensive areas for plantings and fencing of a 3 km section of the creek from stock. Fencing was completed coinciding with last seedlings planted in April 2012. . This was carried out by land owner Bill Perottet with a significant contribution of time and money. The immediate effect will be an increase in density of the groundcover in the riparian zone acting as a sediment trap before surface water reaches the creek. Bill is moving to best-management practices for his pastures and maintains very high ground cover percentage, which reduces run-off water, sediment and nutrients. The fencing prevented Bill's livestock from reaching the creek to drink, so an alternative watering system was built using solar pumps to pump water to a tank high on the property from which a series of stock troughs were fed by gravity.

Engineering works were selected from priority 1 & 2 categories and a contractor, Jamie Williamson was chosen from tender to carry out the works. After approvals were granted and more delays from frequent wet weather works finally began on quarrying rock on site in late 2011. Continued wet weather meant significant

difficulties were encountered in carrying out the rock works in the creek, particularly due to the need to repair farm tracks damaged by machinery movement.

Meanwhile a massive re-vegetation process had begun in 2010 with the selection and collection of seed that was site specific and also had the best chance of survival in the extreme landscape. Generally landholders in this region are used to preparing an area and planting on average 1,000 seedlings per annum. This project proposed way beyond that and it was very encouraging to have a landholder willing to fence and plant out such a large area. Logistics of carrying out plantings of this scale require some forward planning especially for nurseries. The 6 nurseries that provided seedlings for all our plantings were more than up to the task and there were no problems with supply.

Planting was shared by Fields Nursery who began work in spring 2011 and Armidale Tree Group who finished planting in March 2012. Guyra Central School and Black Mountain Public school planted 320 seedlings. Jobs Australia also carried out a day's planting. A total of **16000** trees, shrubs and rushes were established overall. Spacing of plants was deliberately dense from .5 to 1 seedling per metre² to help out-compete introduced grasses and reduce the need for maintenance particularly herbicide use. Survival as of May 5 2012 has been above 90%.Armidale Dumaresq Council have agreed to help maintain the plantings in the post establishment phase for the next 2 years.

The construction of an off-creek wetland, rock ramps and rock revetment of creek banks was finished in March 2012. Within a matter of days after the completion of the wetland and first rock ramp there was a large rainfall event. Interestingly the water entering the wetland was seen to be sediment rich. Upon leaving the wetland and first rock ramp the water was obviously much clearer. Scientific water quality monitoring of the creek was carried out by Ecological Australia but no significant results were obtained due to the short time between completion of works and monitoring.

Urandangie Creek and its tributary gullies are home to Carex Fens, a NSW listed EEC. A significant amount of Carex Fen wetland has been protected from stock with the fencing of the creek. One other unexpected outcome from the initial vegetation surveys on the property was the discovery of a number of small perched wetlands on the southern slopes of some hills. Upon further investigation one wetland at least qualifies as an Upland Wetland EEC. The others are quite unique in their geology and further arrangements have been sought to help protect them.

***Jobs Australia crew after planting at Urandangie***

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| *Outcomes from on-ground works* | • 16,000 seedlings established<br>• 0.5 plant m²<br>• Approx. Area Revegetated 32,000 m2<br>• 6km fencing<br>• 3km (**180,000 m²**) riparian area fenced from stock<br>• 2 rock flumes established<br>• 1 off creek wetland established in riparian zone<br>• 25m rock revetment<br>• 1 technically robust stream restoration and management plan |
| *Outcomes from* | • 1 schools planting day 35 people |

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| *community events* | • 1 field day with 14 people<br>• Urandangie Plan displayed in GSC and ADC offices for 6 weeks.<br>• 4 media releases<br>• 12 unemployed people given 2 days work experience. |
| *Project partners* | • Guyra Shire Council<br>• Armidale Dumaresq Council<br>• Bill & Jacqui Perottet Urandangie<br>• Guyra Central School<br>• Black Mountain Public School<br>• Armidale Tree Group<br>• Jamie Williamson Earthmoving<br>• Fields Native Nursery<br>• Cedar Wholesale Nursery<br>• Galbaan Nursery<br>• Kentucky Tree Nursery<br>• Moons Native Nursery<br>• Jobs Australia<br>• Malpas Catchment Group |

## BIODIVERSITY AND BEAUTIFICATION FOR GUYRA TOWNSHIP

*met outcomes a, c, d, h, i, p, q*,

See appendix 2o.

The project involved the enhancement of an existing planting adjacent to Baldersleigh Rd and the creek draining from Mother of Ducks Lagoon, a site near the local Scout hall and also at a site on the Guyra Golf course. The Guyra Golf Course is situated on a drained portion of the lagoon. Most of the tall native trees in the immediate landscape have disappeared or are senescent. The plantings provided an opportunity to re-plant some of the original taller trees from the area including New England Peppermint. The bowling club saw this project as an opportunity to assist in a planting for wildlife and also providing some protection for members from the elements.

The Baldersleigh Rd. planting features *Hakea microcarpa* a hardy local shrub, and was heavily mulched to provide a low maintenance site for council. School students from Guyra Central and St Mary of Angels planted over 400 trees and shrubs beside the creek. Mick Jarochowicz from ReLeaf was on hand to direct plantings and teach skills to the students. Guyra Council provided a water tanker and it poured rain the next day. Students also took part in a community planting at the Scout hall which followed and planted about 120 seedlings. The planting design considers the recreational needs of the scouts (currently inactive) and the beautification of the town featuring local trees shrubs and graminoids.

The Golf Course site was planted in 2 stages the first with volunteers from the Guyra Golf Club on a day when the weather turned to sleet. The second stage was planted and mulched by contractors Cedar Nursery.

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| *Outcomes from on-ground works* | • 1600 seedlings established at 3 sites<br>• 2700m² area revegetated<br>• 0.6 plants per m² |
| *Outcomes from community events* | • Work Experience students from Macintyre High School, Inverell assisted with filming and interviewing for video documentary. |
| *Project partners* | • Guyra Shire Council<br>• Guyra Golf Club<br>• Guyra Central School<br>• Guyra Garden Club<br>• St Mary of the Angels Catholic School<br>• ReLeaf Vegetation services<br>• Macintyre High School<br>• Cedar Wholesale Nursery |

## STORMWATER FOR MOTHER OF DUCKS LAGOON

*Summary: met outcomes a, d, h, i, j, o, q*

See appendix 2p.

Mother of Ducks lagoon is an Upland Wetland lagoon adjacent to the township of Guyra. It is a nationally-significant wetland which provides habitat for many migratory birds as well as other birds, amphibians and reptiles. Part of the lagoon is a Nature Reserve, while the remainder is freehold land. Part of the Nature Reserve was impounded in the 1970's by a levee to ensure a higher water level than the remainder of the lagoon. The impounded area was fed by underground gates from the rest of the lagoon and by 4 stormwater dams built on the adjacent golf course. Water running off from town enters the dams and any overflow then runs through underground pipes to feed into the impounded area of the lagoon. In very high rainfall events, the dams overflow and run across the golf course into a drain which bypasses the impounded area of MoD and empties into Laura Creek below the lagoon.

Since construction of the levee the underground gates have silted up and blocked and many of the earthenware pipes have become blocked by silt and tree roots. As a result, all water entering at least 2 of the dams runs across the golf course and bypasses the lagoon. HiCUB was approached by both the Guyra Golf Club and NPWS to design a method to remedy this situation. For the Golf Club, the 2 wet winters meant the course was virtually unplayable because of the overflow. For the lagoon, the problem meant that the only water reaching the impounded area of the lagoon was groundwater seepage. The lack of water from the stormwater dams is likely to be a significant problem during drought periods, when high rainfall events like summer storms occur.

After a long period of consultation and a tender process, Williamsons Earthmoving replaced the existing pipes in 2 of the dams with 350mm diameter Stormpro pipe feeding directly into the lagoon. This pipe made the process much quicker and therefore cheaper. The works were supervised by Les Heffernan from NPWS, who was the officer who built the original levee. Because MoD lagoon is an EEC HiCUB referred the project to the EPBC team in the Commonwealth Environment Department and was given approval to undertake the work.

The project had strong support from the Guyra community including GSC who contributed $8000 to enable both dams to be re-piped. The outcome will be significant for the lagoon during high rainfall storms in dry periods and for the golf course during wet weather.

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| *Outcomes from on-ground works* | • Improved hydrological regime for nationally-significant wetland<br>• 200m drainage pipe installed<br>• Improved surface drainage of 2 ha of golf course |
| *Outcomes from community events* | • Cooperative approach to solving the problem by community, council and NPWS.<br>• Highly visible project in Guyra township.<br>• Engagement of Guyra Golf Club in other town projects |
| *Project partners* | • National Parks and Wildlife Service<br>• Guyra Bowling and Recreation Club<br>• Guyra Shire Council<br>• Williamsons Earthmoving |

## THE BROTHERS WALK, BEN LOMOND

*Summary: met outcomes c, i, j, k, l, r*

See appendix 2q.

Through the Guyra Working Group, the Ben Lomond community suggested the development of a walk to the top of 'The Brothers' a prominent peak adjacent to the town. The Ben Lomond community is actively working to retain the population of their town, by focusing on the town's heritage and environment. The village sits at 1370m above sea level and 'The Brothers' rises to 1500m. The community had planned a walking track through the town to take in some of the heritage features and to include a climb to the summit of 'The Brothers'. The HiCUB staff helped the community to choose a route, identify the biodiversity features of the walk, determine land tenure and negotiate a route across private land. From the top of 'The Brothers' a visitor can see large areas of New England and west to Mt Kaputar and associated peaks. A brass plaque was installed at the summit to highlight these features. The walk was marked by track markers on wooden posts, which were installed by BLLG volunteers. A sign was installed at the start of the walk, showing the features of the Ribbon Gum – Snow Gum – Mountain Gum Grassy Woodland through which the walk passes. A corridor of local native vegetation was planted by volunteers on private land adjacent to the start of the walk to provide a corridor for both humans and wildlife to connect the walk to Bushy Park (see below).

*Eucalyptus dalrympleana*

Because the route crosses private land, visitors will be escorted on the walk during prescribed times in order to overcome insurance concerns from the owner. The start of the walk is on a Crown Road and was used during Woodlands Week for a night spotlighting event

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| *Outcomes from on-ground works* | • 200 tree and shrub seedlings planted and fenced<br>• 800m walking track installed<br>• 1 educational sign and 1 brass plaque installed |
| *Outcomes from community events* | • Community involvement in project development and implementation<br>• 2 working bees to plant trees and install markers<br>• 1 spotlighting event with 15 participants<br>• Increased awareness of local EECs |
| *Project partners* | • Ben Lomond Landcare Group<br>• 2 private landholders<br>• NSW Land and Property Management Authority<br>• Guyra Shire Council<br>• Cedar Wholesale Nursery |

## BUSHY PARK PLANTING, BEN LOMOND

*Summary: met outcomes b, i, j, l*

The Ben Lomond Landcare Group (BLLG) suggested many projects to HiCUB, one of them being a planting in Bushy Park. The planting would help BLLG maintain and enhance the existing native bushland in the park, and involve primary students from the local school which is next to the park.
Part of the site was back- burnt prior to the planting in late winter by BLLG. When HiCUB staff arrived with the plants for the working bee in December there was already plenty of natural regeneration occurring. The back-burn had brought up blue devils (*Eryngium sp*.), New England daisies (*Xerochrysum sp. nov*), mountain gum seedlings (*Eucalyptus dalrympleana)* and a bounty of other native herbs and grasses. Braving the unseasonal rain and cold, the Ben Lomond Public School students planted a mix of native shrubs and trees in Bushy Park. Some of the children had planted trees at home before, but it was a first for many. Everyone had lots of questions, most importantly, “how big will they grow” and “how long will it take”. While the shrubs went in the BLLG planted ‘woodland dainties’ amongst the existing bush, including chocolate and bulbine lillies.

The BLLG is now thinking about putting a path through Bushy Park, so people can explore the beautiful bushland without stepping on any woodland dainties.

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| *Outcomes from on-ground works* | • 250 tree, shrub and forb seedlings planted<br>• 0.5ha regenerated<br>• 0.2 ha weed control |
| *Outcomes from community events* | • 2 community working bees with 8 and 4 participants<br>• 1 school working bee with 2 teachers and 15 pupils.<br>• 2 media releases<br>• Awareness of the significance of local bushland raised |
| *Project partners* | • Ben Lomond Landcare Group<br>• Ben Lomond Primary School<br>• Armidale Tree Group |

## URALLA

Summary: *met outcomes a, c, d, e, f, h, i, j, k, l*

Works in Uralla focused on priorities from recommendations contained in the ***Uralla Sub-catchment Management Plan***. See appendix 2r and 2 r (1)

In January 2010, a Uralla Creek Walk was held for the general public, to: inform the Community of the Uralla Sub-catchment Management Plan, the HiCUB project and the structural works to occur during February and March 2010; increase community understanding of environmental issues on the creek; gain community support for and ownership of the plan and works; develop a common understanding for negotiating with landholders; build on community participation in the Plan; and form linkages between community and agencies and between landholders. Interest in the plan generated a background document prepared by Ruth Tremont for HICUB called *Maintaining and Developing the Uralla Sub-catchment Management Plan a Five to Ten-Year Strategy*. This document relates the history of creek works and elaborates on current and proposed works over a ten year period.

The overall objectives of the Uralla sub-catchment management plan are to decrease sediment loads into Rocky and Uralla Creeks and improve the condition of the riparian vegetation within the Uralla sub-catchment. Activities such as stream bed modification and plantings addressing these objectives were undertaken on private, public and council managed land in several locations in Rocky reek and Uralla Creek.

Bush regeneration activities were undertaken in two locations Mount Mutton and The Glen with the aim of stimulating a local group to care for these places and also to provide opportunities for schools, volunteers and participants in Work for The Dole and Juvenile Justice programs.

Uralla Shire Council was very supportive of the HiCUB Project and all Steering meetings were held in council's chambers.

**Alma Park**

Five community planting days were eventually held in Alma Park after cancelling the first two events from rain. These included the previously cleared Uralla Bowling Club site and post SCS construction sites. Three schools events were held in the park including the Uralla River Rallies mentioned below. Over 2000 riparian seedlings were established in 5 sites. Overall more than 100 people contributed time to help plant seedlings and learn more about the creek. This work adds significantly to the work already undertaken in increasing water quality by the Uralla Shire Council and the efforts of the local Uralla Rivercare group.

**Water Rat monitoring**

Uralla Shire Council had received several reports of platypus in the creek at a number of sites in town. Before the second stage of creek works commenced, we engaged Dr Karl Vernes and Dr Darren Ryder from UNE to undertake monitoring of three sites to determine if platypus or water rats were present and in what sort of habitat. Karl and Darren installed motion sensor and bait-triggered cameras along the creek over a period of 2 weeks to capture any aquatic mammals on video. While no platypus was seen, native water rats (*Chrysomys melanogaster*) were recorded at several sites taking sardines from bait traps. Some of this footage can be seen at the beginning and end of the HiCUB documentary video. Platypus and water rats were reported by community members during a biodiversity meeting and associated survey. The Atlas of Living Australia has records of these animals in the urban area of Uralla. Sightings and anecdotal records have been included in the Uralla Biodiversity Plan developed by HiCUB staff.

**Uralla & Rocky Creek Construction Works**

Early in the HiCUB project major rock and erosion control works were carried out in Uralla and Rocky Creeks as part of the implementation of the sub-catchment management plan. By 2012 these works had become covered in vegetation and were performing their functions well. A number of creek bed and bank erosion control works were carried out by Soil Conservation Service (SCS) in the Uralla and Rocky Creeks. They

include the construction of a rock ramp and removal of several willows and rock revetment in Alma Park and construction of a rock flume, removal of several willows and rock revetment in Uralla creek near Queen Street.

As part of the sub-catchment plan, SCS had recommended a small rock flume be established in Rocky Creek near Mt Mutton to address a shallow head cut. Further investigation showed that there was a deeper, more significant head cut further downstream. After obtaining a permit from DPI Fisheries and a Development Application to Uralla Shire Council, a rock flume and rock revetment was constructed by Uralla Shire Council based on a design by Red Frog Environmental Solutions. This work will allow several large willows to be removed without destabilising the creek channel. The site has been revegetated with native grasses and wetland plants, riparian shrubs and trees. Species known to be koala food trees were used on the site to provide habitat for local koala populations and to provide a source of leaves for a koala carer who is located nearby. Construction of in-stream rock works was a new skill for the USC machinery operators. The work was carried out to a high standard under the supervision of Red Frog.

**Alma Park footbridge showing severe head cut in Rocky Creek on left and rock ramp remediation work on right.**

The rock work carried out over two periods and the plantings along the creeks should lead to rapid increases in water quality and overall biodiversity within the urban areas of Uralla. Alma Park is also a source of high volumes of leaves in autumn which have a significant effect on dissolved oxygen levels in the creek. The plantings adjacent to the creek in Alma Park will act as a barrier to these leaves entering the creek with a subsequent improvement in water quality.

**Rudd property**

A private landowner Charlie Rudd who had previously over number years planted the gullies and creek on his property with willows to stabilise them took part in the project with the poisoning of the same willows. The gullies had long since stabilised and grassed over and Charlie saw this as a chance to remove the propagative potential of the willows now proliferating in the creek further downstream. Galbaan was contracted to carry out the initial poisoning and a follow up treatment is planned in a future project “Whacking Willows” (Community Action Grant). Charlie carried out a nearby planting with 300 native seedlings.

**The Glen**

The Glen is an area on the outskirts of Uralla once affected with severe gully erosion. Through the work of local Landcare groups, the USC and others, the gullies have been stabilised and the area has been the scene of tree planting activity for a number of decades. The area offers open space and has a number of sculptures installed by the Uralla Arts community. HiCUB project officer Chris Whackett undertook working bees on a regular basis for a period of 8 months and in that time controlled weeds and along with USC removed weeds from the site.

During the life of HiCUB 2 Frog Dreaming events for small schools were held at The Glen. HiCUB staff assisted with planned activities including tree planting and bush regeneration.

A small gully headcut identified in the Uralla Sub-catchment Management Plan 2 was investigated by Soil Conservation and HiCUB staff. The gully head originates in NSW RailCorp-owned land. This was initially a

small headcut and the SCS planned to build a diversion bank to take water away from the erosion into another gully. The site is not easily accessible during wet weather, so the very high rainfall over the last two seasons meant the work could not be carried out. The high rainfall, combined with a change in drainage in the railway reserve, significantly increased the erosion in the gully. By February 2012, the gully had moved 7m towards the railway line and was 5m deep. HiCUB approached John Holland, the new maintenance managers for the line and they agreed to take on the repair work. The best quote HiCUB obtained for this work was $55,000. HiCUB contributed an engineering design and will assist with EPBC surveys of the site.

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| *Outcomes from on-ground works* | • 2000 riparian seedlings established over 5 key sites<br>• 25m³ woody weed removed from The Glen<br>• 630 m² area remediated The Glen<br>• 15m³ woody weed removed from Rudds<br>• 3000m² area treated Rudds<br>• 300 seedlings established Rudds<br>• Area Revegetated 3000$m^2$ with plants at 1m spacings<br>• 300$m^3$ of rock donated and transported by Uralla Shire Council (Value $18000)<br>• 4 rock flumes established<br>• 50m rock revetment constructed |
| ***Outcomes from community events*** | • 5 public working bees in Alma Park (50 people x 2 hours)<br>• 3 Schools working bees<br>• 1 management plan |
| *Project partners* | • Uralla Shire Council<br>• U3CF<br>• Soil Conservation Service<br>• Uralla Rivercare Group<br>• Uralla Central School<br>• Armidale Tree Group<br>• Fields Native Nursery<br>• Cedar Wholesale Nursery<br>• Galbaan<br>• Kentucky Tree Nursery<br>• Moons Native Nursery<br>• John Holland Pty Ltd |

## MT MUTTON

Summary: *met outcomes a, b, c, d, g, h, I, j, k, l*

See appendix 2s.

Mount Mutton is a dominant feature in the town of Uralla and contains important remnant vegetation, is important geologically and historically and is now under protection and zoned as an E2 Environmental Area by Uralla Shire Council (USC). The hill and surrounding areas were mined for gold from the latter half of the 19th century causing severe erosion in gullies and creeks and denuding much of the lower slope of Mt Mutton. Attempts at revegetation using Monterey and Slash Pine in areas around the hill and Uralla generally have resulted in an increasing number of Yellow Tailed Black Cockatoos in the area. The pine cones and seeds are spread by the cockatoos throughout adjoining woodland communities including Mt Mutton and if left to grow soon begin to shade out most other species. The native vegetation of Mount Mutton Reserve consists of a diverse woodland/open forest dominated by Silver-top Stringybark and other local Eucalypt species supported by a grassy understorey in some areas and shrubbier understorey in others. The shrubbier areas are also dominated by a range of introduced woody weeds such as Hawthorn, Cotoneaster and Privet.

USC constructed a walking track around the hill in 2009 and the area is now popular for walkers and runners. This unfortunately has resulted in an influx of other weeds particularly grasses on the track edge and also high nutrient from dog excreta. There is a stand of Box Gum Grassy Woodland adjacent to the Mt Mutton Reserve which is slowly being invaded by pines, African Love Grass and other weeds. As part of the HiCUB project, SNEL and Uralla Shire Council developed a project to remove the pines and revegetate with native grasses. This proposal was submitted unsuccessfully to the Environmental Trust, but we will continue to seek funding for the project now that it has been developed.

Upon discussions by HiCUB with USC, the Uralla Gold Fields Trust adjoining Mt Mutton, interested bushwalkers and neighbours, a bush regeneration plan was developed for the hill. A walk around the hill identifying plants with ELA botanist Lachlan Copeland was popular among locals. HiCUB committed to providing one staff member to conduct working bees at the hill once a month and several working bees were held to try and develop a group that would carry on the work post HiCUB. Attendance at monthly working bees was poor and we changed the times and dates to try and encourage others but to no avail. This was disappointing given the large amount of interest for the project earlier on.

Nevertheless huge inroads were made into removing the existing weed burden. HiCUB contracted Galbaan to remove a large stand of Privet from the top of the hill and this work was carried on by Chris Whackett at monthly working bees. A total of 60m³ was removed from bushland and taken away by USC. Other activities were held with local service clubs and Uralla Central School which removed more weeds. Chris Whackett and the occasional volunteer removed large volumes of African love grass, privet, cotoneaster, firethorn, hawthorn

**HiCUB staff Chris Whackett and Dave Carr with the result of 3 hours of their labour on Mt Mutton.**

and other weeds. The area of Mt Mutton where the bush regeneration was focussed has a predominantly grassy understorey with a high diversity of native forbs. The removal of woody weeds that were threatening this patch has left the bush in very good condition in most parts. The Monitoring and Evaluation report for Uralla has more detail on this success.

Uralla Central School participated in an ecology walk and tree planting activity lead by HiCUB's Nic Cobcroft and Brenda Shepherd. Students developed ideas on habitat and community as well as planting their own tree within an area undergoing rehabilitation.

A program was set up with Armidale Juvenile Justice Community services to undertake bush regeneration on Mt Mutton. Up to four young people with a supervisor worked with Chris Whackett to remove weeds. This program is continuing on after HiCUB with the support of USC.

During Woodland Week a public nest box building workshop was held building nest boxes, for birds, sugar gliders and possums. Boxes were pre-cut ready for people to assemble (see Video Documentation). The newly-formed Uralla Lions Club catered for dinner then everyone followed Phil Spark on a spotlighting expedition to Mt Mutton.

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| *Outcomes from on-ground works* | • 60m³ woody weed removed from bushland<br>• Approx. area remediated 15,000m²<br>• 300 seedlings established<br>• Nest boxes installed to provide habitat for rosellas, bats and sugar gliders |
| *Outcomes from community events* | • Ten Year strategy developed for maintaining sub-catchment plan<br>• 25 school students involved in several activities<br>• 6 juvenile offenders involved in work program<br>• 4 community volunteers contributed 36 hours bush regeneration labour<br>• Two guided walks with a botanist and a fauna ecologist attracted 50 people who gained a better understanding of local biodiversity.<br>• Project developed to remove pines and grassy weeds from remainder of reserve and adjacent Box Gum Grassy Woodland (Unsuccessful but will be resubmitted) |
| *Project partners* | • Uralla Central School<br>• North West Ecological Services<br>• Dept Juvenile Justice<br>• Uralla Shire Council<br>• Uralla Lions Club<br>• Uralla Goldfields Trust<br>• Jobs Australia<br>• U3CF |

## RIVER RALLIES

*Summary: met outcomes a, c, d, i, j, k, l*

See appendix 2t.

Children from Uralla Central School were invited to participate in an outdoor, interactive, environmental education experience. Throughout the day the group learnt about native fish, macro-invertebrates and riparian restoration. Sixty students planted over 150 trees, shrubs and grasses in Alma Park, a site of the Uralla Creek Sub-Catchment Management project. HiCUB and Uralla Shire Council collaborated to bring River Rallies 2011 together. Uralla Shire Council has committed to finding ways to run the event in the future.

Uralla Central School has since become involved in bush regeneration on Mt Mutton. Senior students will continue to monitor the site at Mt Mutton using a transect set up by ELA.

***Projects Manager, Nic Cobcroft, and Uralla Central School students planting the creek banks in Alma Park.***

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| *Outcomes from on-ground works* | • 200 seedlings planted |
| *Outcomes from community events* | • 60 children from Uralla Central School participated in River Rallies workshops |
| *Project partners* | • Uralla Shire Council<br>• Uralla Central School<br>• EcoLogical Australia<br>• Department of Industry and Investment, Fisheries<br>• Uralla Rotary Club |

## APSLEY RIVER CORRIDOR AND WALCHA WOODLANDS

*Summary: met outcomes a, c, d, e, f, h, i, j, k, l*

See appendix 2u.

***Apsley River*** .The Walcha working group voted to make rehabilitation of the Apsley River within the levee banks of Walcha its focus project. Briefly, works would involve the river bed modification and minor beautification measures recommended by Floodplain Risk Management Committee. Undertaking any rehabilitation works within the levee system needed to be consistent with flood management guidelines so that the structural integrity of the levee banks was maintained and that the hydraulic conveyance of the river within the levees was not compromised. These recommendations are quite specific and it was a challenge to develop a plan that had maximum benefits for biodiversity, beautified the area and was consistent with flood management guidelines.

Shortly after HiCUB staff members were employed in 2010 a meeting with the Walcha working group decided that HiCUB Projects Manager Nic Cobcroft should develop the plan for Walcha in consultation with others who may be able to assist. Fortunately former floodplain engineer and now Walcha Anglican Minister Keith McPherson who had taken a keen interest in the NSW Floodplain Risk Management Process for Walcha now volunteered his time to assist in the process of designing the river bed modification.

Planning began in July 2010 and after months of continual rain and minor flooding the first chance for the surveyors Hawkins Hook & Co. to survey the river wasn't until December the same year. A number of modifications were designed for the river bed including widening and deepening of the channel, re alignment of sections of straight channel to a meander, the creation of two pond and riffle sequences and the installation of 3 large logs. After consultations and various revisions the plan was accepted by Walcha Council in March 2011 pending approvals. Once NSW Fisheries approvals had been granted wet weather meant that a start on construction works within the river would be delayed until late 2011.

In the meantime significant progress had been made in revegetation works with most levee plantings finished or underway. Seedlings were planted at high densities typically 5 per m² in order to reach maximum groundcover as soon as possible after planting thus reducing weed competition and the possibility of erosion. Seedlings were planted into prepared areas covered with pre-slitted jute mat installed by Fields Native Nursery. No milk cartons, stakes or mulch were used. Most planting of the site was carried out by Kentucky Tree Nursery and Moons Native Nursery. Walcha Shire Council staff also prepared and planted a large area of the riverine plantings along with Jobs Australia from Armidale. Two community planting days were held with members of the community, Lower Apsley Rivercare Group, and TAFE.

The earthworks and engineering was undertaken by Walcha Council using their own staff and contractors. SJ Wall Earthmoving undertook most of the construction work, which included using a rubber tracked dump truck to move dirt and rocks within the construction site. This equipment was essential because of the wet, boggy conditions. The alternative of building tracks for wheeled vehicles was far too expensive. The dumper was also

used in Uralla on the HiCUB project there.


A key component of the plan was the deposition of spoil from excavation works in the river to a site nearby, saving time, money and the project's carbon footprint. Fortuitously the local Presbyterian Church, located adjacent to the works, had an area of land that contained a stand of Monterey pines beyond their safe lifespan and growing within a depression, the perfect site for the spoil. The church readily agreed to removing the pines and allowing spoil to be deposited at the site followed by landscaping and planting.

The project area is in the centre of town and has a high profile. A number of local artists' sculptures have been installed around the levees and add significantly to the landscape. The crest height of the levee banks has recently been brought to a uniform level and capped with a concrete path. Many more people now enjoy the easy level path and recreation activity has intensified during the life of the project.

The completed works are very popular with the Walcha community. As Gerry Moran (Walcha Council) says in the HiCUB video "the project has united two sides of town formerly separated by the river".

***Walcha Woodlands***. Threatened remnant woodlands occur within and surrounding Walcha these are: Ribbon Gum, Mountain Gum, Snow Gum Grassy Forest/Woodland of the New England Tableland Bioregion; New England Peppermint (*Eucalyptus nova-anglica*) Grassy Woodlands; and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

A component of the Apsley River Corridor & Walcha Woodlands plan was to improve connectivity to the Apsley riverine corridor with threatened woodland ecosystems, raise awareness of their values and carry out bush regeneration in these areas. Armidale Tree Group bush regeneration team was contracted to undertake bush regeneration works in two significant urban remnants. The Biodiversity Plan for Walcha recommended

removal of woody and grassy weeds in these remnants. This weed control was undertaken in November 2011, with Walcha Council collecting and disposing of green waste. Both remnants are examples of Ribbon Gum-Snow Gum-Mountain Gum Grassy Woodland in moderate condition. The weed removal will ensure the long-term viability of the remnants.

***Armidale Tree Group bush regeneration team carry out weed control and removal at Walcha Lookout***

During Woodland Week HiCUB, Ecological Australia and Phil Spark conducted a fauna and flora exploration of the Walcha Common. Local residents had the opportunity to observe and learn more about local plant and animal species and threatened woodlands.

Walcha Council was particularly supportive of this project. Initially HiCUB developed plans for four stages of the river in town and when costed, it seemed only 3 stages could be completed. Additional funds were secured by Walcha Council through an Environmental Trust project managed by the Namoi Regional Organisation of Councils, which enabled the fourth stage to be completed.

In the short term the project has created a huge amount of community interest and enthusiasm for the rehabilitation of the river within the levees. In the long term the project works both in the river and in woodland remnants will demonstrate the environmental and social benefits of caring for our natural heritage.

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| *Outcomes from on-ground works* | • approx. area revegetated 10,000m²<br>• 20,000 seedlings planted<br>• site coverage approx.3 plants/m²<br>• 800m Apsley River bed and channel modified<br>• 2 rock riffles<br>• 3x large woody debris installed<br>• 30m³ woody weeds removed<br>• 500m² area of woodland weeded |
| *Outcomes from* | • 2 community planting days |

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| *community events* | • 4 community presentations<br>• 4 working group meetings<br>• Public launch with local state member Richard Torbay.<br>• TV coverage on 2 regional stations.<br>• 10 media articles<br>• 35 volunteers at 2 working bees |
| *Project partners* | • Walcha Shire Council<br>• SJ & L Wall Earthmoving<br>• Hawkins Hook & Co Consulting Surveyors<br>• Fields Native Nursery<br>• Cedar Wholesale Nursery<br>• Galbaan Nursery<br>• Kentucky Tree Nursery<br>• Moons Native Nursery<br>• Armidale Tree Group<br>• Lower Apsley Rivercare Group<br>• TAFE<br>• Treetop & Garden services<br>• Presbyterian Church Walcha<br>• NEWA<br>• Namoi Regional Organisation of Councils |

## REGIONAL

There were a number of projects that were not confined to one particular town or which had an impact across the whole region. These included events such as SLEX and Frog Dreaming which draw people from across the region and beyond.

In addition to these activities, HiCUB staff actively participated in other regional initiatives such as New England Sustainability Strategy (NESS), the New England Wind community wind farm project, Farming the Sun solar bulk-buy scheme and Northern Rivers and Border Rivers-Gwydir CMA Catchment Action Plan development. We also supported regional groups such as SLA, National Parks Association, the Soils Forum and the Regional Energy working group by providing meeting space and equipment.

Frog Dreaming

Pellet Heaters

Biodiversity Plans

Sustainable Living Expo (SLEX)

EASTLECC project

Indian Myna workshops

Florabank Seed Collection Workshop

School Biodiversity Gardens

## FROG DREAMING

Summary: *met outcomes a, b, d, j, k, l, m, n*


Picture 80 inspired school children dancing around a fire chanting to the hum of drums and didgeridoo – story telling through dance, drama and song – this was at the heart of the 2010 and 2011 Uralla Frog Dreaming children's conference. Held in Uralla at the showground and 'The Glen' over 2 days, this innovative environmental education conference connected children from our regional primary and secondary schools with one another and with the land.

Each year Frog Dreaming gets local students involved in a series of workshops, performances, developing action plans, and a whole lot of fun centred on learning about the environment and our connection with it. In 2010 and 2011 HiCUB sponsored the conference coordinators, who had been successfully delivering Frog Dreaming since 2008.

Prior to the conference students from each school were asked to identify a local natural resource management issue of importance to them. They then designed and developed a performance based on this issue and presented it in front of the other schools at the conference. Following on from the performances the students with their teachers discussed the possibilities of turning their ideas into action, develop a plan and present it to the conference. To help make these plans a reality, representatives from Southern New England Landcare, Uralla Shire Council, Border Rivers Gwydir CMA and Northern Inland Regional Waste were on hand to provide support and resources to develop, implement and manage their projects.

Each year students are divided up into 6 tribes, each with a totem that defined their individual group. These tribes are led by Gurus and student mentors local high schools. Together they spend a very eventful afternoon designing a name, a flag and a story as well as partaking in some very interesting ice breaker activities – a great way to get to know one another. As night falls, the group walks by the light of lanterns from the Uralla showground down to 'The Glen'. The tribes then tell their stories to their friends and families by the light of the full moon and a very generous bonfire.

Workshops are always hands on and give everyone a chance to contribute. Over the years Frog Dreaming has given participants the chance to learn about the importance of frogs and do 'frog habitat plantings', explore music and art as a way to express themselves, bush regeneration and plant ID, Water Watch, Aboriginal heritage and a biodiversity walk.

Kelly Coleman from the Border Rivers-Gwydir CMA said *"I think the kids had a really good time, and learnt a lot in the process. I thought the storytelling was very special, the fire twirlers were fantastic and the drumming circle to end festivities was truly beautiful!"*

## PELLET HEATERS

*Summary: met outcomes m, n, o, p*

See appendix 2v.

The Northern Tablelands has very cold winters due to the altitude. Firewood is a very common form of space heating, with most wood collected from dead fallen or standing trees. Firewood collection has a large negative effect on biodiversity by removing habitat for many birds, mammals, reptiles, amphibians and invertebrates. Smoke from poorly operated wood heaters is a major cause of air pollution in winter; with Armidale having worse air pollution than Sydney at this time of year.

HiCUB convened a workshop to discuss the issue in 2010, with Dr David Freudenberger (CSIRO/Greening Australia) presenting to Council and community members. The workshop recommended the investigation of pellet heaters as an alternative to wood heaters. Southern New England Landcare successfully applied to Rural Industries Research and Development Corporation (RIRDC) for a research project to progress this matter, with Armidale Dumaresq Council contributing $10,000 in cash and kind, and HiCUB contributing $20,000 in cash and kind. RIRDC contributed $22,000. The HiCUB in-kind was derived from the cost of planning and establishing the planting at Armidale's Waste Transfer Centre (see elsewhere in this report) which is designed to be a demonstration of a firewood plantation.

The project, which will report to RIRDC in June 2012, is expected to recommend: changes in Council policy; the establishment of a group purchasing scheme for pellet heaters and pellets; an education campaign; and Council incentives for pellet heater purchase.

At SLEX 2011 an operating pellet heater attracted lots of interest with a small group of interested buyers being formed. A public forum in May 2012 will bring Council, industry and community together to discuss next steps.

| | |
|---|---|
| ***Outcomes from on-ground works*** | • Establishment of a planting to demonstrate the establishment and management of local species for firewood or other biofuels. |
| ***Outcomes from community events*** | • Leverage funding of $32,000 from RIRDC and ADC,<br>• Attendance and presentation at 2011 Bioenergy Conference<br>• Display (working heater and posters) at SLEX 2011 potentially seen by 5000 visitors<br>• Major research report published nationally<br>• Recommendations to change Council policy and for community action<br>• Establishment of a demonstration pellet heater in a community group office |
| ***Project partners*** | • Armidale-Dumaresq Shire Council<br>• University of New England- Institute for Rural futures<br>• National Centre for Rural Greenhouse Gas Research (UNE and DPI)<br>• Sustainable Living Armidale<br>• Rural Industries Research and Development Corporation<br>• Armidale Tree Group |

## BIODIVERSITY PLANS

*Summary: met outcomes a, b, d, h, i,*

See appendix 2w.

The Business Plan for HiCUB included a recommendation that Biodiversity Plans be developed for Armidale, Guyra, Walcha and Armidale. The aim of these plans is to provide guidance for Councils and the community for the identification, conservation and management of biodiversity 'assets' within the urban areas of each town. Councils expressed strong interest in the development of these plans to guide future projects and for the development of grant applications.

In the early stages of this project, we sought existing plans for each town, such as the Greening Plan for Armidale, prepared in 2000. We then used a number of methods to identify other biodiversity assets:

- Existing flora and fauna surveys,
- Atlas of Living Australia records,
- NSW Wildlife Atlas,
- Herbarium records, particularly from UNE's NCW Beadle Herbarium,
- Community consultation through email requests and workshops,
- New surveys undertaken by HiCUB,
- Woodland Week activities.

We then developed a methodology for creating biodiversity plans which would be valuable for Councils and community groups (see Attachment 2w). We decided to primarily focus on public land and to make the Biodiversity Plans adaptable, rather than finalised, documents. Plans were produced for each town (see Attachment 2w) and will be published on the Southern New England Landcare and each Council's websites. The plans have already been used by Councils to develop projects for roadside vegetation management in Walcha and Guyra, which attracted funding >$90,000 for implementation (Roadside Vegetation Improvement Program – NSW Environmental Trust). The plan for Armidale was also used in a successful bid to the Biodiversity Fund for $44,000 for Dumaresq Creek works.

The Plans are currently being used in Uralla and Guyra to prioritise weed control and bush regeneration; in Walcha to develop new project proposals and in Armidale for the development of new plantings and bush regeneration work.

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| ***Outcomes from on-ground works*** | • Flora and fauna surveys in urban sites in Guyra, Ben Lomond, Armidale, Uralla and Walcha.<br>• Biodiversity Plans for Armidale, Uralla, Guyra and Walcha |
| ***Outcomes from community events*** | • Leverage funding of ~$200,000 using the Plans,<br>• Community consultation workshops in Guyra, Walcha and Uralla with 12 people,<br>• Flora and fauna species lists provided by Technical Advisory Group members,<br>• Educational activities for community and council staff in Uralla, Guyra and Walcha.<br>• |
| ***Project partners*** | • Armidale-Dumaresq Shire Council<br>• Uralla Shire Council,<br>• Walcha Council,<br>• Guyra Shire Council,<br>• University of New England- Ecosystem Management<br>• Phil Spark – North West Ecological Services<br>• Sustainable Living Armidale<br>• Atlas of Living Australia<br>• Department of Environment and Climate Change / Office of Environment and Heritage<br>• Steve Debus – fauna consultant<br>• Armidale Tree Group volunteers |

## WOODLANDS WEEK

*Summary: met outcomes a, c, h, k*

The New England region is home to some of Australia's best woodlands. To celebrate their significance HiCUB coordinated the first 'Woodlands Week' to raise awareness of woodlands, their unique flora and fauna, the threats facing them and management options.

Held in the school holidays, the week provided an excellent opportunity for parents to give their kids a new and exciting experience, and for all to learn and become more aware about their local woodland's plants, animals and birds. Communities in Walcha, Uralla, Armidale and Guyra were given opportunities to explore local woodlands, go spotlighting, build nest boxes to provide extra habitat, do bush regeneration, and get up close and personal with some of the creatures that call the woodlands home.

Local bush regenerator, Kate Boyd, opened woodlands week with a tour of the Drummond Park and Snow Gums Bush Reserve, Armidale. These bushland reserves have received a lot of attention from volunteer bush regenerators over the years. With the community gathered around, ADC Deputy Mayor Jim Maher launched 'Woodlands Week' and spoke of the importance of maintaining natural woodland remnants in towns. Throughout the week fauna ecologist, Phil Spark, found many woodland creatures. People who came along were lucky enough to get a close look at microbats, legless lizards, blind snakes and more. Phil also did comprehensive fauna lists for many urban woodlands and this information will be shared with Councils in the Biodiversity Plans.

To conclude the week the Armidale Tree Group had prepared a fabulous program of speakers, bird-watching tours, tree planting, a barbecue and a jumping castle. Everything was set for a great day, except for the weather. The field day at the Woodland Centre and the Mike O'Keeffe Memorial Woodland highlighted the restoration of grassy woodlands. A steady stream of people joined in site tours to look at the Tree Group's trials to restore grassland plants. A quick tour of the dam area discovered many aquatic birds using different habitats. In the afternoon volunteers planted 200 trees.

Councils in each of the four towns supported 'Woodland Week', some even running events. We are planning to run the event again this year with the Armidale Tree Group, who currently has funding for grassland restoration projects. HiCUB applied for Environmental Trust Bush Regeneration funding to continue the event, and to further promote the protection and enjoyment of New England woodlands. SNELCC will continue to run Woodlands Week as an annual spring event and will seek funding and sponsorship to do so.

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| ***Outcomes from on-ground works*** | • Comprehensive flora and fauna lists compiled for Guyra, Armidale, Uralla and Walcha<br>• 15 nest boxes built to provide habitat for parrots, bats and sugar gliders. Extra habitat on Mt Mutton is needed due to the small number of hollow-bearing trees found amongst the Silver-top Stringybarks |
| ***Outcomes from community events*** | • 90+ people attended events during Woodland Week<br>• 4 media articles<br>• Program of 8 events in all towns in the project area.<br>• |
| ***Project partners*** | • Armidale Tree Group<br>• Uralla Shire Council<br>• Guyra Shire Council |

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| | • North West Ecological Services (Phil Spark)<br>• Armidale-Dumaresq Council<br>• EcoLogical Australia<br>• Ben Lomond Landcare Group<br>• Uralla Lions Club<br>• University of New England |

## SUSTAINABLE LIVING EXPO (SLEX)

*Summary: met outcomes h, j, k, l, o*

The Sustainable Living Expo (SLEX) runs annually in Armidale, inviting vendors and community groups to showcase all things sustainability over a spring weekend. From 2009 to 2011 HiCUB, in partnership with Southern New England Landcare, were on board with displays covering everything from New England biodiversity to chook houses to plastic pollution.

In 2009, the first year at SLEX, HiCUB was promoting itself. Having recently been granted funding, the project was developing, and this was a good opportunity to get the community interested early on. In 2010 the focus was on bringing biodiversity into public focus. Our main project was 'Exploring New England Biodiversity'; run with school students in Armidale, Guyra and Uralla. We brought the schools together with artists, the Botany Department at UNE and the Thalgarrah Field Studies Centre to first research and then create an artwork based on a local native flora or fauna species. These artworks were done on posters shaped like *Eucalyptus nova-anglica* (New England Peppermint) leaves and calico banners and displayed collectively at SLEX 2010. The artworks were a talking point of SLEX, and many children brought mum and dad along to see their work. The colourful display at SLEX was a fantastic way of illustrating the diversity of flora and fauna in New England. The HiCUB display also covered riparian health, and provided the opportunity to launch the Dumaresq Creek Riparian Works project. A water flow demonstration showed the effect of meanders and vegetation of water velocity, and therefore erosion, and was displayed in conjunction with the plan and concept design of the project. This was popular with kids who could use buckets and water from the pond to test the demonstration. We also worked with the Galbaan group to build a plastic bottle boat which had its maiden voyage captained by Costa Georgiadis, from Gardening Australia, on the duck pond.

By 2011 HiCUB had established quite a profile, both in the local community and at SLEX. This year we worked with other community groups, including Sustainable Living Armidale and Southern New England Landcare to put together the 'Village Green' precinct. The 'Village Green' aimed to show people how they could "*step back, slow down and lead a richer, healthier life*". The HiCUB site incorporated vegetable boxes, cooking demonstrations, biodiversity and connectivity information, workshops and a chook house competition.

Armidale High School and members of the community grew and contributed the vegetable produce, which was displayed and used in the cooking demonstrations. If cooking demonstrations weren't on, there was clay seed ball or potato stamp making workshops to entertain the crowds. HiCUB supported the SLEX EdFest day when 500 school children attended and were given a structured, curriculum-driven program of events and activities. HiCUB provided the coordinator for this event, ran many of the activities and sponsored 'The King and Queen of Green', an environmental theatre troupe. HiCUB also ran a series of 'Urban Biodiversity Tours' over the weekend which were designed to showcase local biodiversity, and encourage people to protect it in their backyards.

Southern New England Landcare will continue to have a presence at SLEX and support the festival in the future.

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| ***Outcomes from on-ground works*** | • PLC Armidale students designed and built the winning chook house<br>• Armidale High School students produced several boxes of vegetables in their agriculture class for the vegetable display<br>• Cooking demonstrations used local, organic, seasonal produce |
| ***Outcomes from community events*** | • 3 day festival with more than 10,000 in attendance<br>• Display of HiCUB projects and key messages<br>• 2 urban biodiversity tours<br>• 4 seed ball and potato stamp making workshops<br>• 4 cooking demonstrations<br>• 5 media articles, plus advertisement and inclusion in the SLEX guide<br>• HiCUB featured in UNE's SLEX display and media<br>• 50 banners produced by school students<br>• 250 leaf artworks produced by school students |
| ***Project partners*** | • Sustainable Living Armidale<br>• Armidale High School<br>• The Armidale School<br>• PLC Armidale<br>• Southern New England Landcare<br>• Armidale-Dumaresq Council<br>• Border-Rivers Gwydir CMA<br>• Armidale Tree Group<br>• Armidale Rotary<br>• Thalgarrah Field Studies Centre<br>• University of New England, NCW Beadle Herbarium<br>• New England Community of Schools |


## EAST ARMIDALE SUSTAINABLE LIVING EDUCATION AND COMMUNITY CENTRE (EASTLECC)

*Summary:* *met outcomes e, k, m, n, o, p*

See appendix 2h

The Armidale School (TAS) recently purchased the old YCW club and football grounds in East Armidale and redeveloped it as a trade training centre. The site also includes a block of land previously used as Aboriginal housing, a waste dump and a grazing paddock. TAS, in conjunction with New England Girls School (NEGS), initiated plans to develop a sustainability centre on the site. The plans for the site included meeting spaces, demonstrations of building and gardening products, innovative architecture, education facility, café, gallery and landscaped grounds.

TAS approached the NSW Environmental Trust who then referred them to HICUB for funding to undertake a feasibility study into the project and to look at design and implementation options. The HiCUB steering committee approved the support for the study as a regional project and approved additional funding for on-ground works on the site through the Armidale budget (see Activities – Armidale).

Both the steering committee and HiCUB staff were unsure of the viability of such a centre and were concerned that the centre may have a negative impact on existing environmental education initiatives such as the Armidale Tree Group Woodland Centre and the Department of Education's Thalgarrah Field Studies Centre. We directed to consultant reviewing EASTLECC to examine these issues as part of the study. After gaining approval to fund 'feasibility studies' through the Environmental Trust, HiCUB supported the project. TAS appointed a consultant, Hadley White, who conducted a detailed study of options for developing the Centre. This included looking at alternative options and sites.

The findings of the study are contained in Attachment 2h. In the end, the report recommended against establishing a new sustainability centre from scratch, citing examples from around Australia and the world where successful centres arose from grass roots action, rather than by starting with a building. Despite this recommendation, the process involved in the study resulted in strong cooperation between many community and Council organisations focussing on the Black Gully / Newling and New England Regional Art Museum (NERAM). The final recommendation was to encourage community organisations to begin developing components of the vision of EASTLECC organically. This coincided with HiCUB activity in Black Gully, the establishment of the Community Garden, Council's development of a community trust for the Newling parklands and community interest in establishing a cultural and environmental precinct in this part of Armidale encompassing the Armidale Tree Group and Mike O'Keeffe Woodlands, TAFE Agriculture, the Aboriginal Cultural and Keeping Place, Newling Grounds, NERAM, the Community Gardens and the Regional Conservatorium.

In some cases feasibility studies result in recommendations to seek large amounts of funding in the future. In this case the feasibility study probably stopped a development which would have been expensive and in the end, not well-utilised. The recommended slower, organic outcome will be much more likely to endure and be well-utilised. This is a good outcome from a feasibility study.

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| ***Outcomes from on-ground works*** | • See Activities - Armidale |
| ***Outcomes from community events*** | • 1 feasibility study,<br>• Engagement of many key stakeholders in discussing options for sustainability and development of a public space. |
| ***Project partners*** | • TAS<br>• NERAM<br>• SLA – Community Garden<br>• Aboriginal Cultural and Keeping Place<br>• Armidale Tree Group<br>• Starfish Enterprises<br>• Newling Reserve Trust<br>• NEGS<br>• TAFE – Agriculture campus<br>• Armidale-Dumaresq Council |

## INDIAN MYNA WORKSHOPS

*Summary: met outcomes d, h, l, r*

See appendix 2x.

In partnership with Landcare CSO a project was developed to raise awareness of the spread of the Indian Myna and prevention methods. Workshops were held in Uralla and Guyra with assistance from a Project Officer from Nambucca who has been building a network of observers, recorders and trappers.
Posters, advertisements in local papers, Council newsletters and radio announcements helped promote the event. A number of information leaflets were produced to assist in identification, prevention of spread and trapping techniques. These are available at all Council offices and SNELCC.
HiCUB provided two traps per council area. Uralla Shire took the initiative to have another 10 traps made for ratepayers. The Walcha Men's Shed collaborated by building most of the traps. A presentation was made to the Armidale Men's Shed and they produced two traps.

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| ***Outcomes from on-ground works*** | • 14 Indian Myna traps<br>• Information leaflets produced and distributed to 4 cou |
| ***Outcomes from community events*** | • 2 community workshops<br>• 28 participants |
| ***Project partners*** | • Indian Myna Bird Project<br>• Walcha Mens Shed<br>• Armidale Mens Shed<br>• Uralla Shire Council<br>• Guyra Shire Council<br>• Walcha Council<br>• Armidale-Dumaresq Council |

## SEED COLLECTION WORKSHOPS

*Summary: met outcomes h, i, j*

*See Appendix 2y*

Consultations with the nursery industry in July 2010 showed that they had a strong interest in training in plant identification and seed collection. Staff expressed concern about current seed collection practices and difficulties getting the diversity of species required for HICUB projects. A one day Introductory course was delivered for community members.

HICUB organised and ran a Florabank Professional Seed Collectors course with all regional nursery staff attending. The accredited course was delivered at an advanced level and ran for 3 days. Feedback from attendees was very positive and indicated that participants would make positive changes to their seed collecting and storing methods.

*Seed collection workshop attendees learn about using a vacuum aspirator on their collected seeds from Field's Native Nursery.*

| | |
|---|---|
| ***Outcomes from on-ground works*** | • Increase in diversity of species available to HiCUB projects<br>• Increase in quality of seed collected and stored |
| ***Outcomes from community events*** | • 10 attendees from nurseries across the New England trained in Florabank Professional Seed Collection course<br>• Field trip focussed on plant identification. |
| ***Project partners*** | • Florabank (Greening Australia)<br>• Moon's Native Nursery<br>• Armidale Tree Group<br>• Cedar Wholesale Nursery<br>• Field's Native Nursery<br>• Greening Australia<br>• Kentucky Native Nursery |

## SCHOOLS BIODIVERSITY GARDENS

*Summary: met outcomes i, k, l*

Schools within the project area were invited to participate in the HiCUB project by designing and implementing a biodiversity garden project within their school grounds. HiCUB provided up to $400 worth of trees, materials or equipment for each project. Projects varied from tree plantings, wetland construction and signage to the establishment of vegetable gardens and composting facilities. Teachers used the gardens to give a practical lesson linked to different parts of the curriculum.

The schools project gave us an introduction to the school communities which we were later able to use to get schools involved in other activities. While the gardens will only have a small impact on local biodiversity, they will have a lasting effect on the school children who participated in the projects.

Participating schools included:

- Armidale City Public School,
- Black Mountain PS,
- Kentucky PS,
- Duval High School,
- Armidale High School,
- New England Girls School,
- Chandler PS,
- The Armidale Waldorf School,
- PLC Armidale (assisting the Ascent Group),
- Thalgarrah Field Studies Centre,

# PARTNER/STAKEHOLDER COMMUNICATION

In early 2010 the HiCUB project, along with Social Ventures Media, developed a Communications Strategy (See appendix 3a). The purpose of this was to define a basic framework for the communications of the HiCUB project. It covers the communications between HiCUB and the communities of Walcha, Uralla, Armidale and Guyra, partners and other stakeholders.

The objectives of the communications strategy were to ensure that:

- Communities, sponsors and stakeholders are informed and engaged in and with HiCUB activities and personnel.
- HiCUB's profile is established through marketing and promotion as a project to assist the communities of Walcha, Uralla, Armidale and Guyra in their efforts to improve the biodiversity of these urban environments.
- HiCUB's activities and programs are promoted strategically to New England communities – including audiences that may not be actively engaged in or aware of urban landscape rehabilitation activity.
- The HiCUB project team, Project Steering Committee, Advisory Committees and M&E Consultant communicate effectively to manage, govern and monitor the project.
- The themes and objectives of HiCUB are promoted as a project in process - HiCUB is an opportunity to build on and instil a sustainable and conscientious ethic in the community based on knowledge and respect of the environment and to promote opportunities for future development.

Once we had established the 'HiCUB Brand' we began general communications and event-specific communications to maintain a constant presence in the community and to achieve the above objectives. Our main tools were an online presence, local newspaper and radio, email and signage.

**The HiCUB Website and online**

In 2010 we developed the HiCUB website 'www.hicub.org.au' to connect the New England community with resources and information from HiCUB, and other environment and sustainability initiatives. The website has been our main communication tool, providing information about the HiCUB project, events, HiCUB sites, tips for biodiversity conservation and environmental rehabilitation, past media, how to volunteer and a photo gallery.

*HiCUB.org.au* is an interactive site, and enables user generated content and discussion. Figure A shows the increase in monthly usage over the life of the project. The Business Plan proposed that HiCUB should develop a 'manual' of techniques suitable for use in riparian, bushland and revegetation projects. We found that there was already a wealth of material available, so we focused on gathering this information and making it available through the website as an accessible resource.

At our busiest period for on-ground works (from mid to end 2011) we found that having an online calendar was useful to let the community know what was on in their town. This was supplemented by the eNewsletter.

Facebook has also played a role in HiCUB's communication strategy, mostly to promote events. The 'event' function on Facebook made it easy to invite large numbers of people to working bees and workshops. Attendance results were a bit hit and miss with this, sometimes everyone at an event found out on Facebook.

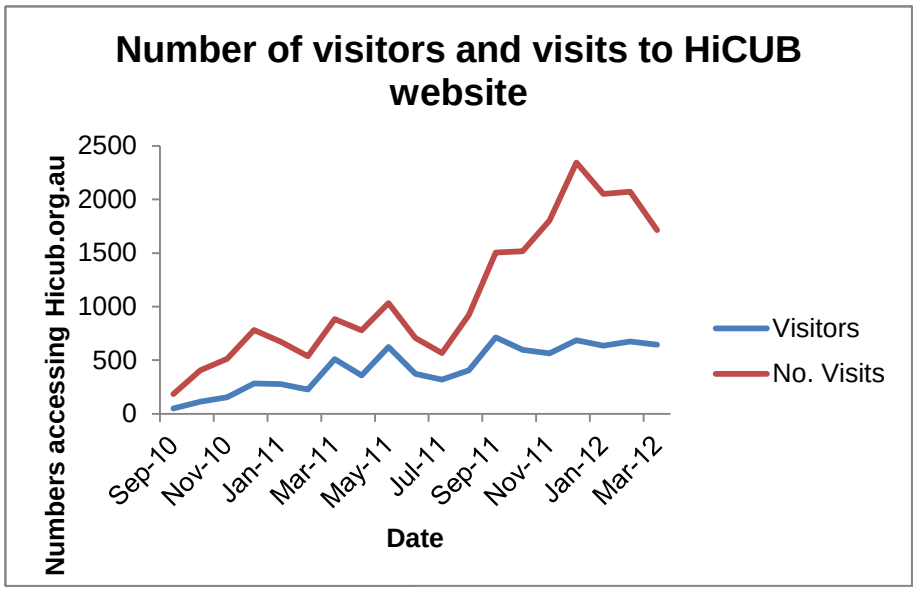


Figure A. Number of visitors and visits to HiCUB

This catered to a very specific audience (Facebook users) and some groups, like UNE Landcare will continue to use it.

**Local print media and radio**

Print and broadcast media was used to promote and advertise the HiCUB project and project events and to engage the community. We used the papers to run advertisements for major events, run more than 30 media releases for working bees and workshops, and public notices to invite expressions of interest for contracts for HiCUB works.

Our greatest asset was the weekly HiCUB article, which began in February 2011 in *The Armidale Independent*. Over 60 'HiCUB articles' have been published to date in the Independent. Rather than developing all the articles in-house, we have drawn on our community to provide material for the column. Everything from community gardens, to floods, local plants, snow gums, solar energy, threatened species and fish poo has been covered by authors from UNE, SLA, the Armidale Tree Group and the rest of the community. The articles will continue in the paper after HiCUB finishes and *The Armidale Independent* is now including an 'Environment' page in every edition. A selection of these articles can be viewed on the HiCUB website at http://hicub.org.au/project/?page_id=835.

After visiting our sister project 'Bush Futures' in the Tweed-Byron region we began to run a series of 'ads' based on a publicity program they had running (See appendix 3b). These ads picked a key message from the HiCUB communications strategy (people have a direct impact on biodiversity, HiCUB is here to regenerate shared outdoor spaces, etc) and promoted it using pictures and key points. These ads have also proven to be good display material for field days and expos.


In addition to the articles and media releases provided by HiCUB the project appeared 31 times in the local media, including three news items on TV. Articles were written by local papers about HiCUB works, events and festivals.

**Email**

From the start we found that email was one of the most effective tools to communicate with our partners and the community. We sent out the first HiCUB eNewsletter in September 2010 to 108 people, including members of the advisory and steering committees. Since then, the eNewsletter has grown to 232 subscribers. The eNewsletter was a useful tool to share information about upcoming events, HiCUB projects in progress, other community events and news in the environment sector.

In addition to providing the eNewsletter to people who have indicated an interest, we have also used email to target groups (such as SLA, AURG, Southern New England Landcare) who can use their networks to distribute information.

**Signage and posters**

We developed signage for the project to notify people of HiCUB works and to invite the community to events. “Work in Progress” signs were developed for all of our on-grounds works sites, and included contact details. Signs were also put up in the four main towns to let the community know “Whats On” in their town. These were updated with details of working bees and workshops as they came up. Posters were used to promote some events, like Woodlands Week and the Black Gully Music Festival. These were put up in the main streets of town, in shop fronts and on notice boards. Interpretive signage was also used at 7 sites to highlight the local EECs. The showcase plantings in Armidale used creative signage to label the species used and to identify sponsors and participants. Logs, stumps and recycled timber were installed at each site and laser or oxy-acetylen cut steel letters were used to create eye-catching signs. Other signs were used throughout the project to invite the community to participate in voluntary activites to work on particular sites.

The communications strategy helped to plan all communications, in terms of the needs of each event and the target audience. By having a constant presence, providing event specific communication and using different tools HiCUB was able to raise awareness of the HiCUB project and its objectives; promote the key messages of the HiCUB project; encourage participation in HiCUB activities; encourage behaviour change in the community relating to HiCUB objectives; and raise awareness of project sponsors, particpating organisations and partners. The social monitoring conducted by ELA shows that there was a significant increase in awareness in the community about the HiCUB project. We attribute this to the efforts we put into getting the weekly column in ‘The Independent’ and the high level of activity in the second half of the project.

# STAKEHOLDER ENGAGEMENT/PARTICIPATION

## a. TABLE OF PROJECT PARTNERS

| Partner | Engagement | Participation Level |
|---|---|---|
| **Guyra Shire Council, Armidale Dumaresq Council, Uralla Shire Council, Walcha Council** | Councils have provided: Councillors and/or staff members to participate in Steering Committee and Advisory Committee meetings, meeting rooms, display space, advertising of events, attendance at working bees, contacts within the community, use of Community Newsletters, presence on the Technical Advisory Panel, support for Indian Myna Workshop, provision of water tanker for planting, office space, mulch for projects, in-kind hours from council staff in project development, and data. | H |
| **Armidale Dumaresq Council** | Coordination of SLEX.<br>Provision of >1000m3 of mulch. Donation of rock for creek works. Coordination of Dumaresq Ck rock revetment. Technical advice for creek land and bush regeneration projects. Provision of venue for some Advisory Committee meetings. Loan of tools and equipment and maintenance of SNEL tool trailer. Partner in pellet heater project. Green waste removal from all sites. Significant contribution to initial project development (Carol Davies). | H |
| **Guyra Shire Council** | Cash contribution to MoD project. Technical advice on all projects. Green waste removal from bush regeneration events. Promotion of events in monthly newsletter. | H |
| **Uralla Shire Council** | Donation of rock for creek works. Significant staff time contributed from Environmental Officer Stephanie McCaffrey. Major contractor on Mt Mutton creek works. Green waste removal from Mt Mutton and The Glen. Provision of meeting venue for all Steering Committee meetings. Presentation at LGSA awards ceremony. Provision of public event venues. | H |
| **Walcha Council** | Walcha Council was also the major contractor for work in Apsley River. Project supervision and planning. Provision of materials and mulch for rehabilitation of Presbyterian Church Site. High level of involvement from staff in tree removal & chipping, final stages of planting and assistance to the Projects Manager .particularly from Stephen Sweeney WSC | H |
| **New England Weeds Authority.** | Technical advice for weed control, assistance with the Black Gully Project planning and spraying weeds, and have been heavily involved in the Dumaresq Creek Riparian works. | H |
| **Southern New England Landcare Ltd** | As contractor to the project to deliver project management and procurement of project resources, SNEL also contributed their skills in community education, capacity building, participatory processes, co-ordinating volunteers, coordinating environmental rehabilitation works, community networks, website, newsletter, tools and equipment.<br>Coordinator of initial project development. | H |

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| **The Project Advisory Committee** | The Advisory Committee had a representative on the Project Steering Committee and was a two-way link to the project stakeholders that form the Project Advisory Committee. It contributed community networks, local knowledge of biodiversity assets, urban stream management, bush regeneration techniques, working with volunteer groups and project prioritisation. | H |

## b. TABLE OF PROJECT STAKEHOLDERS

| Organisation | Engagement | Participation Level |
|---|---|---|
| **Jobs Australia** | A job network running Work Experience Program on behalf of the Australian Government. Jobs Australia developed and provided work crews to work on HiCUB projects; including Black Gully, Walcha and Urandangie; and managed traineeships for Galbaan. | H |
| **SLEX** | Annual sustainable living expo provided an opportunity for HiCUB to showcase its achievements. SLEX included a sustainable house, garden and farm tour; community education; forums; demonstrations and a celebration. HiCUB was on the planning committee, and benefited from a presence in this community festival. | H |
| **University of New England** | The UNE Talloires Group supported the set-up of bush regeneration project in planning stages, and ongoing planting working bees by UNE Landcare. The Botany Department was a partner in developing the school biodiversity activity. There was a joint research bid to RIRDC with Institute for Rural Futures, and UNE also partnered with HiCUB in other funding bids. Currently, the UNE Facilities Management Services is working with UNE Landcare on a creekland project. | H |
| **The NSW Environmental Trust** | Provided funding for the project and support with strategic planning and implementation. The NSW ET reviewed HiCUB project reports. They provided links to the State network of Councils running Urban Sustainability Grants through cluster meetings. | M |
| **Catchment Management Authorities** | Provided technical and planning expertise, funding, links to regional planning, education extension and capacity building. | M |
| **Office of Environment and Heritage** | Contributed community awareness and education tools, community access facilities to biodiversity assets, biodiversity management, technical advice, assistance with applications for works under the EPBC Act, regional biodiversity strategies, expertise in engaging the indigenous community in NRM. They also contributed extensively at the Frog Dreaming festival, and provided posters/material for Biodiversity month display at Uralla and SLEX. | M |
| **NSW Department of Primary Industries** | DPI participated on the advisory committee, provided information and advice on Native Fish regulations and ran native grass ID courses for HiCUB. | M |
| **Bush Futures Project** | The Tweed-Byron Bush Futures project was also a USP funded project. HiCUB corresponded regularly with the Bush Futures project, and made an exchange visit where we picked up several ideas which we then implemented in HiCUB. | M |
| **Department of Lands** | Landholder, contributed information relating to land use and tenure. Provided permission to hold the final project event in Black Gully. | L |
| **NSW National Parks Association** | National Parks were active on the Advisory Committee, and provided expertise and knowledge to HiCUB | L |
| **Nurseries (see appendix 4a)** | | |

| Organisation | Engagement | Participation Level |
|---|---|---|
| **Armidale Tree Group** | The Armidale Tree Group is a not-for-profit environmental group with native plant nursery and bush regeneration skills. They have contributed knowledge of native vegetation, propagation, establishment and availability, community education, bush regeneration and native vegetation establishment to HiCUB. When HiCUB ends they will take on management of the Black Gully site. | H |
| **Cedar Wholesale Nursery Armidale** | Local native nursery which contributed knowledge of native vegetation, propagation, establishment and availability, and planting services. | H |
| **Kentucky Tree Nursery** | Local native nursery which contributed knowledge of native vegetation, propagation, establishment and availability, and planting services. Kentucky Tree Nursery also contributed to the HiCUB article in the local weekly newspaper. | H |
| **Fields Native Nursery Uralla** | Local native nursery which contributed knowledge of native vegetation, propagation, establishment and availability, and planting services. Fields also provided seed, technical advice, site maintenance and preparation, geotech and rock for major HiCUB projects. | H |
| **Moons Native Nursery Walcha** | Local native nursery which contributed knowledge of native vegetation, propagation, establishment and availability, and planting services. Moons also provided seed, technical advice, site maintenance and preparation. | H |
| **Galbaan Healing Our Environment Group Armidale** | This indigenous community environmental group has worked with HiCUB to set up a Wetland Nursery, collect seed, propagate and plant seedlings by contract. HiCUB has also held two sustainability workshops, attended by 20 people each for Galbaan. Galbaan has provided plants and work teams for fencing, ground preparation, planting and maintenance of HiCUB plantings. | M |
| **Schools (See appendix 4b)** | | |
| **Organisation** | **Engagement** | **Participation Level** |
| **New England Community of Schools (heads), Armidale and Uralla public primary and secondary schools** | The community of schools had an active involvement in “Exploring New England Biodiversity”, and with their help we were able to engage more local schools. HiCUB produced school book stickers themed around New England Biodiversity, and these will be distributed via the schools to all students in the four towns. The School Biodiversity Gardens were also actively promoted by the Community of Schools. | H |
| **TAFE Rural Studies Campus Armidale** | TAFE ran a Sustainability workshop, Horticulture and Business courses for Galbaan, provided nursery facilities, conducted field trips, and ran joint town and garden biodiversity workshops with HiCUB. The TAFE team volunteered their services for a planting in Walcha. The Rural Skills Campus was the site of the Galbaan Nursery that grew plants for HiCUB projects, with staff providing assistance. | H |
| **Thalgarrah Field Studies Centre** | Thalgarrah has provided ongoing support for the Frog Dreaming educational festival, and was a partner in developing “Exploring New England Biodiversity” project. Planted a biodiversity garden. | H |
| **Uralla Central School** | Participated in "River Rallies" in Alma Park and Mt Mutton, Uralla. Uralla students attended 1 Water week activity planned by Uralla Shire Council/HiCUB, 2 planting days on Creek and 1 Bushcare day. Ongoing | H |

| | | |
|---|---|---|
| | monitoring of Mt Mutton using transects established by HiCUB/ELA. | |
| **The Armidale School** | TAS were the leaders of the EASTLECC proposal which included a feasibility study and on-ground works. The on-ground works were completed as a part of the RoundSquare Conference and the school children planted 1400 seedlings and did two days of bush regeneration, sponsored by HiCUB. | H |
| **Armidale High School** | Year 10 Agriculture grew vegetables for SLEX and provided posters for a display, planted a schools biodiversity garden. | M |
| **Duval High School** | Renovated and planted Showcase site 5, planted a schools biodiversity garden. | M |
| **Guyra Central School** | Participated in plantings in Guyra in town and at the Urandangie site. | M |
| **Minimbah School** | Planted showcase Site 2 in Armidale. Attended Frog dreaming. | M |
| **New England Girls School Armidale** | Entered the "Chook House" design competition for SLEX. Conducted 2 native plantings in Martins Gully. Planted a schools biodiversity garden. | M |
| **Presbyterian Ladies College, Armidale** | In conjunction with HiCUB and Ascent Group worked on Ascent Group's Garden for Volunteer week. | M |
| **St. Johns Primary School** | Held two native plantings in Martin's Gully. | M |
| **Waldorf-Steiner School** | Planted a biodiversity garden using seed balls and wildflowers at their school. | M |
| **Black Mountain School** | Participated in plantings in Guyra in town and at the Urandangie site. Planted a schools biodiversity garden. | M |
| **Ben Lomond Public School** | Involved in the Bushy Park planting in Ben Lomond. | M |
| **O'Connor Catholic College** | Native planting at the school, seedlings selection and technical advice provided by HiCUB. | M |
| **Chandler Public School** | Planted a schools biodiversity garden. | L |
| **Armidale City Public School,** | Planted a schools biodiversity garden | L |
| **PLC Croydon** | Girls from PLC Croydon participated in a planting bee and a weed removal working bee. | L |
| **Kentucky Public School** | Planted a schools biodiversity garden | L |
| **Landcare and Community Groups** | | |
| **Organisation** | **Engagement** | **Participation Level** |
| **Armidale Urban Rivercare Group** | This community rivercare group has worked with HiCUB to rehabilitate large areas of Dumaresq Ck. AURG has provided knowledge of urban stream rehabilitation, history of works done, and the skills of members to working bees and works planning. AURG has a good network in the community, and this was helpful in recruiting volunteers. | H |
| **Sustainable Living Armidale** | Significant contributors to the development of the project and the Business Plan. SLA was part of the Advisory committee, and contributed their knowledge of sustainability issues and the local community to HiCUB. They were involved in many community working bees, and worked in partnership with HiCUB on the demonstration "Village Green" site for SLEX. SLA has also contributed to the weekly column in the | H |

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|---|---|---|
| | Independent. Final HiCUB event – SLA monthly forum. | |
| **New England Sustainability Strategy Executive (NESSiE)** | NESSiE was a two-way link to the New England Sustainability Strategy and a link to community networks for HiCUB. They were active in SLEX, the Community Wind Farm Project, Advisory Committee and Technical Advisory Panel, web site, communication strategy and branding through synergy agreement. | H |
| **Bush Carers - Kate Boyd** | Kate was active on the Steering Committee and Advisory Committee. She also ran weekly bush regeneration activities in Armidale, and provided technical advice and developed management plans for other bush regeneration projects. | H |
| **Community volunteers** | Volunteers in the Landcare Resource Centre have assisted with mapping, sign development, preparation of display material, events and administration. Working bees have also attracted large numbers of volunteers who have helped plant, mulch and maintain plantings and bush regeneration sites. | H |
| **Citizens Wildlife Corridors** | CWC is a community conservation group and played a role on the Advisory Committee and providing technical advice to the project based on their networks, knowledge of vegetation habitat corridors, community engagement and their newsletter. We have worked together at SLEX, and also in joint funding applications. | M |
| **Uralla Rivercare Group** | URG has contributed their knowledge of Uralla and Rocky Creeks to the river projects to be carried out in Uralla. They have worked together with HiCUB to develop walk along Creek with Display map, bollards and a brochure. HiCUB assisted URG to obtain a Community Action Grant. | M |
| **Lower Apsley River, Glen GRO and BOZO Landcare Groups** | This collection of rural Landcare groups has existing wildlife corridor plans connecting with Walcha township, including koala habitat, expertise in large scale native tree establishment and working bees. They have participated in planting working bees along the top of the river bank in Walcha, and HiCUB has assisted them in a successful bid to Community Action Grants. | M |
| **Ben Lomond Landcare Group** | Ben Lomond Landcare helped develop plans for HiCUB projects in Ben Lomond, including the Brothers Walk and a planting in Bushy Park. They were also involved in Woodlands Week, working bees and the Guyra working group. | M |
| **Malpas Catchment Group** | Malpas Catchment is the town water supply catchment to Armidale and Guyra. The Catchment Group has been engaged in Urandangie activities and participated in planting working bee with school children from Guyra Central and Black Mountain schools. | M |
| **New England Regional Art Museum (NERAM) and Friends of NERAM** | The Black Gully project provided the opportunity to become involved with the NERAM. A group of NERAM members and neighbours formed the 'Friends of Black Gully' group which helped coordinate community working bees. | M |
| **Ebor VillageLink** | Ebor VillageLink proposed a 'Sphagnum Moss' protection project, and HiCUB helped them fence off an EEC from an area of TSR and plant a section of the TSR. | M |
| **UNE Landcare** | Developed site management plans and held several planting and bush regeneration working bees with HiCUB support. | M |
| **Armidale Lions Club** | Provided catering for all Armidale Urban River Care events, and volunteered at community working bees. | M |

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| **Youth Leading the World** | Youth led and run sustainability conferences were held in 2009 and 2010. These conferences involved school and university students learning about sustainability and planning actions they could do in their communities. HiCUB was a major sponsor, and also helped facilitate and organise the 2010 conference. | M |
| **100% Renewables** | HiCUB supported the Armidale 100% Renewables campaign, including the organisation of a Forum on renewable energy with MP Tony Windsor, the Independent Member for New England. | L |
| **Australian Youth Climate Coalition (AYCC)** | HiCUB supported the development of New England AYCC group, which was involved in the 100% renewables campaign and is active on the UNE campus. | L |
| **Uralla Lions Club** | Provided catering for Uralla events, and also planted a site on Uralla Creek in Alma Park. | L |
| **Businesses and other organisations** | | |
| **Organisation** | **Engagement** | **Participation Level** |
| **Urandangie Pastoral Holdings** | Labour, materials, land for the Urandangie project. Bill and Jacqui Perottet were active and substantial contributors to the project | H |
| **Evans Publishing (the Armidale Independent)** | The Armidale Independent provided space for the HiCUB project to run a weekly article, and also was useful for advertising and publicity. | H |
| **Armidale City Signs** | Provided signage for HiCUB project – events, displays, showcase plantings. | H |
| **Red Frog Environmental Solutions** | Engineering design and supervision for projects in Uralla, Guyra and Armidale. | H |
| **ReLeaf Vegetation Management Services Mick Jarochowicz** | Supervise Jobs Australia and Juvenile Justice work crews, environmental planting preparation and maintenance. High input to Dumaresq Crk works & Black Gully including creative design and construction. | H |
| **EcoLogical Australia** | EcoLogical Australia was the successful tenderer for the monitoring and evaluation contract. In addition to doing the M&E, they have participated in Showcase plantings by providing $500 and volunteer labour. | H |
| **UNE Facilities Management Services** | Supported the UNE Landcare group in four planting activities, and maintained planting sites. Will provided $30,000 funding for the removal of willows and other woody weeds from Dumaresq Ck on UNE campus for the next three years, and continue to maintain plantings. | H |
| **Soil Conservation Service** | SoilCon Services were the successful tenderer for Uralla Creek works, and were therefore involved in the major Uralla project. They have also made an in-kind contribution to Armidale Tree Group by helping with gully stabilisation. | H |
| **SJ & L Wall Earthmoving Walcha** | Riverbed modification, rock riffle construction and spoil management for the Walcha project. Use of equipment on other projects. | H |
| **Williamson Earthmoving** | Contractor for the major earthworks in the Urandangie and Stormwater to Mother of Ducks Lagoon projects. | H |
| **Green Scene landscapes** | Erected signage, sponsored Showcase site 6, high involvement in showcase sites preparation and maintenance, & Black gully rehabilitation chipping & tree work. | H |
| **Alex Cunningham – SilviCulture Contracting** | Removed and mulched the pyracantha hedge as contractor for the Birds, Berries, Bush project. | M |
| **Armidale City Bowling Club** | Sponsored Showcase site 9 and Armidale City Bowling Club members held several planting working bees at the site. | M |

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|---|---|---|
| **Guyra Golf Club** | Partnership to provide additional water to Mother of Ducks Lagoon via two dams, two planting sites on Golf course and prep of all Guyra urban plantings sites. | M |
| **National Parks and Wildlife Services** | Advice on Mother of Ducks Lagoon project; wetland advice; provision of herbicide to two community groups; Technical Advisory Group | M |
| **Shout Graphics** | Contracted to help with layout and design for handouts, advertisements, school name labels, and other publications. | M |
| **Laszlo Szabo (Social Ventures Media)** | Videography and production for HiCUB documentary. Communications workshop and strategy. | H |
| **North West Ecological Services** | Site surveys for native fauna and fauna workshops. | M |
| **UNE – Ecosystem Management** | Survey of Rocky and Uralla Creeks for water rats, provided technical advice to the UNE Landcare Group and other HiCUB projects. | M |
| **Terry Rhodes Bobcat** | Provided rock and gravel for Showcase Site 11. | M |
| **New England Solar Power** | Sponsored and planted Showcase site.7 | M |
| **Stackmans' Quarry** | Rock for Walcha project | M |
| **Hawkins Hook & Co** | Surveying and drafting designs for the Walcha and Uralla plans | M |
| **Sport UNE** | Sponsored and planted Showcase site.1 | M |
| **New England Mutual** | Sponsored and planted Showcase site 11, and has also consistently provided volunteers for working bees in Armidale. | M |
| **Juvenile Justice** | HiCUB set up a project in Uralla and provided a supervisor and tools for weekly working bees. Uralla Shire Council will continue the project, including | M |
| **Armidale City Signs** | Display Banners, Works in Progress signage, showcase sponsor signs, other signage | M |
| **Warwick Browne** | Provided ArcMap training and support to HiCUB staff. | L |
| **Eaton Gorge Theatre Company** | Environmental awareness performances at SLEX. King and Queen of Green | L |
| **Yarrandoo EcoLodge** | Provided accommodation and meeting room for the HiCUB team planning meeting and steering committee meeting | L |
| **PJ and CM Ducat** | Provider of gravel, dirt, cement for showcase sites | L |
| **New England Timbers** | Hardwood for signage on the Brothers Walk, Guyra; for the Uralla Walk | L |
| **Wayne Poss Bobcat** | Donated and delivered timber for all showcase signs and seating Worked on Uralla Creekworks | L |
| **Armidale Men's Shed** | Built Indian Myna traps | L |
| **RIRDC** | Co-funded Pellet Heater project | L |
| **UNE Institute for Rural Futures** | Partner in Pellet Heater project | L |
| **Armidale Aboriginal Keeping Place and Cultural Centre** | Meeting venue and participation in Black Gully planning process | L |
| **New England Heritage Centre and Regional Archive** | Preparing and storing archive on HiCUB project | L |
| **Grazag** | Fencing Material | L |
| **Walcha Men's Shed** | Built ten indian myna traps and the seating for the Walcha levees | L |
| **Doug Cotton** | Chipper hire in Walcha and Armidale | L |
| **Treetop Services Scott Kermode** | Pine removal and chipping in Walcha | L |
| **Schultz Bros. Engineering** | Showcase Signs | L |
| **Archdale Family Walcha** | Donated logs for large woody debris Apsley River | L |
| **Laser Studio Uralla** | Showcase signs & walking track boot prints | L |

# MONITORING & EVALUATION

The HiCUB Steering Committee engaged Ecological Australia (ELA) after an open tender process, to undertake the Monitoring and Evaluation of the project and to provide feedback throughout the project to encourage continuous improvement.

The brief for ELA was to undertake detailed M&E on a subset of project activities, covering both biophysical outcomes and social outcomes. Monitoring and Evaluation was to be carried out against the project's objectives and anticipated outcomes. An extract from ELA's final report is included in this section and the full report, as well as full reports for each of the towns and the social M&E program, can be found in the Attachments to this report (Appendices 5b to 5j) .

ELA, with UNE as a sub-contractor, worked independently from the HiCUB staff to undertake Monitoring and Evaluation. Monthly reports were provided to the HiCUB staff and the Steering Committee.

In addition to the ELA Monitoring and Evaluation activities, HiCUB implemented a number of other M&E actions. These were designed to monitor specific activities or outcomes.

**Soil contamination of Dumaresq Creek.**

Works on Dumaresq Creek were a major activity of the project in Armidale. ADC made us aware of known sites contaminated by polycyclic aromatic hydrocarbons (PAH), spread by floods from the former site of the town gas works. The contaminants are known to cause severe irritation and allergy after short term exposure and cancer after long term exposure. We wished to know the extent of the spread of this pollutant along the creeklands, and worked with Dr Sue Wilson from UNE to support an Honours student to map the extent of the contamination and test methods of its distribution by suspended sediment and uptake by willows. The results of this work enabled us to avoid several 'hot spots' and target our works to sites with low levels. The full Honours thesis and associated test results have been provided to ADC, AURG, SNEL and through the University library.

**HiCUB Video Documentation**

During late 2010 the Steering Committee was struggling with ways to fully document and monitor the outcomes of the HiCUB project. The breadth of the project and the huge diversity of activities was identified as being likely to cause difficulties in communication project outcomes. The Steering Committee suggested commissioning a documentary of the final stages of the project.

Laszlo Szabo of Social Ventures Media (SVM), who had assisted with the development of the Communications Strategy, was engaged to document the final stages of the project from July 2011. This was the busiest period of the project. SVM filmed many hundreds of hours of footage and interviews across most project sites. Special emphasis was placed on monitoring community involvement in the project. Interviews were conducted with key stakeholders in the project as well as members of the community.

The resulting 38 minute documentary **is attached to this report** and forms a key part of the report. The aims of the video document are to:

1. Account to the Environmental Trust and local stakeholders,
2. Record the 'intangible' outcomes of the project,
3. Be a record for future projects to use in their development.

The documentary was recently screened to a public forum organised by SLA as part of the local accountability. Those who saw it described it as a very moving account of the project. Footage not included in the final edit will be classified by town and made available through SNEL and Councils. A full set of footage will be stored in the New England Regional Archives. A shorter version (6 mins) was also produced for use on project stakeholder's websites and to provide to elected councillors in each LGA (see https://vimeo.com/43091300). DVD copies of the full video have been given to all project stakeholders as a lasting record of their involvement in the project.

**Uralla Water Rat and Platypus Monitoring**

See Activities – Uralla for details of this M&E activity.

**Flora and Fauna Surveys**

ELA conducted flora surveys and aquatic invertebrate surveys in some sites, but other surveys were conducted during the project. Flora surveys were conducted for most project sites by David Carr and Nic Cobcroft. In many cases members of the Project Technical Advisory Committee also contributed new or existing flora surveys.

During Woodland Week, Phil Spark carried out brief fauna surveys at a number of sites. Technical Advisory Committee members also provided bird survey data. We also used the Atlas of Living Australia extensively to access previous records of flora and fauna for project sites.

Information gathered in this way was used for project planning, for baseline monitoring, to avoid unnecessary impacts on wildlife and to inform the Biodiversity Plans for each town.

**Project Reports**

Project reports, particularly the Progress Report (Dec 2010) and this Final Report, provide records of the outputs and some of the outcomes of the HiCUB project. These documents report the activities, the strategies, the methods, resources and people involved in meeting the projects Objectives.

The Program Logic, a key component of the Business Plan and the M&E Strategy, links the activities to the outcomes and objectives. Each progress report to the Environmental Trust has included an updated Program Logic, recording progress against key indicators.

Appendix 5a shows progress made by the project against the Program Logic, including Strategies and Activities.

**The following text is an extract from ELA's whole-of –project report:**

## 1.1 HICUB PROJECT OBJECTIVES

The HiCUB project stated five program objectives. These objectives were designed to align with objectives established by federal, state and local Government, regional policies (such as Catchment Management Authorities) and those of the Urban Sustainability Program. The five HiCUB project objectives were to:

1. Improve the ecological health of urban riparian and bush lands; reduce the abundance of weeds, increase in area the quality of native vegetation, reduce erosion and improve habitat linkages at landscape scales.
2. Improve the effectiveness of councils and community efforts in environmental rehabilitation through improved integration, collaboration and greater knowledge transfer between councils and stakeholders.
3. Monitor, evaluate and implement improvement in approaches to rehabilitation of urban areas.
4. Increase long-term participation in urban ecosystem rehabilitation targeting community volunteerism and investment from private and government sources.
5. Improve resource use efficiency – increase use of council mulch; increase uptake of rebates for rainwater tanks, and alternative energy technology; decrease nutrient load in town water supply.

Each of these project objectives align with anticipated project outcome/s (**Eco Logical** Australia (ELA) was engaged in September 2010 to undertake the monitoring and evaluation (M&E) component of the HiCUB project to fulfil Objective 3. The M&E project was required to encompass both physical and social outcomes of the HiCUB project.

Table 1**)**.

Eco Logical Australia (ELA) was engaged in September 2010 to undertake the monitoring and evaluation (M&E) component of the HiCUB project to fulfil Objective 3. The M&E project was required to encompass both physical and social outcomes of the HiCUB project.

**Table 1: Anticipated project outcomes**

| ANTICIPATED PROJECT OUTCOMES | OBJECTIVE |
|---|---|
| The ecological health of urban riparian lands maintained and improved | 1 |
| The ecological health of urban bushlands maintained and improved | 1 |
| The area of functional riparian land and habitat corridor increased | 1 |
| Effective council /stakeholder collaboration on environmental rehabilitation through shared planning, training and monitoring processes and cooperative work | 1, 2, 3, 4 |
| Project governance structures that develop mechanisms to encourage project activities that will be sustained | 2, 4 |

| | |
|---|---|
| beyond project lifetime | |
| A Future Funding Mechanism established and investment partnerships developed to fund the continuation of project works | 2, 4 |
| Council zoning and development decision processes informed by technically robust biodiversity management plans and stream restoration plans, with community input | 1, 2 |
| Community group and council activities guided by technically robust biodiversity management plans and stream restoration plans | 1, 2, 3 |
| Knowledge and skills developed and shared on the effectiveness of rehabilitation techniques for urban riparian lands and bush lands to inform plans and ongoing management | 1, 2, 3, 4 |
| Increased capacity of the urban community to manage natural resources | 1, 2, 3, 4, 5 |
| Participation in urban sustainability activities increased across the broader community and schools | 1, 2, 3, 4, 5 |
| Increased awareness, understanding and ownership among residents of the natural areas within the towns | 1, 2, 4 |
| Increased awareness and understanding of the impacts of our resource use | 5 |
| Decreased unsustainable resource use; increased utilisation of council mulch, increase uptake of rebates for rainwater tanks, and alternative energy technology | 5 |
| Implementation of innovative mechanisms developed by community groups to achieve more sustainable use of resources | 5 |
| Increased community engagement in mechanisms to achieve increased sustainable resource use | 5 |
| Improved ecological function, specifically nutrient filtration of one or more of the tributary streams entering town water supply | 5 |
| Increased landholder engagement and support in project activities on private land | 1, 5 |

## 1.2 REPORT OBJECTIVES

This M&E Report has been prepared as a final report to HiCUB as part of their overall reporting commitments to the NSW Environmental Trust.

The objectives of this report are to:

- Document the approach to the monitoring and evaluation for the HiCUB project;
- Provide a summary of monitoring results;
- Provide an evaluation of the HiCUB project based on anticipated project outcomes and outputs for both social and biophysical indicators.

The report aim is to provide a synthesis of the M&E undertaken during the HiCUB project.

## 1.3 REPORT STRUCTURE

This report provides an overall summary of the M&E strategy undertaken by ELA for the HiCUB project.

Each of the appendices provides a detailed M&E report for each sub-project monitored during the HiCUB project that includes methods, results and key learnings. Where applicable, data sheets and the results of previous monitoring were also provided. All background information (including any related management plans, data sheets and historical monitoring results) will be provided to HiCUB for archiving.

This report is structured as follows:

| SECTION | CONTENT |
|---|---|
| Section 2 | Outlines the M&E strategy applied to the HiCUB project |
| Section 3 | Summarises key M&E outcomes of the HiCUB project |
| Section 4 | Identifies M&E constraints |
| Section 5 | Provides recommendations regarding the approaches and methods used in the HiCUB project based on the results of the M&E project. |
| Appendix 5c | Final Report –The Apsley River Riparian Project (see Attachments) |
| Appendix5d | Final Report – Armidale Bush Regeneration (see Attachments) |
| Appendix 5e | Final Report – Dumaresq Creek Riparian Works (see Attachments) |
| Appendix 5f | Final Report – Walcha Bush Regeneration (see Attachments) |
| Appendix 5g | Final Report – Urandangie Creek Rehabilitation (see Attachments) |
| Appendix 5h | Final Report – Uralla Bush Regeneration (see Attachments) |
| Appendix 5i | Final Report – Uralla Creek Riparian Works (see Attachments) |
| Appendix 5j | Final Report – Social Indicators (see Attachments) |

The HiCUB M&E strategy was designed to fulfill Objective C:

> *Monitor, evaluate and implement improvement in approaches to rehabilitation of urban areas.*

The M&E strategy was designed to:

- Determine whether the HiCUB project met the other four objectives during and upon completion of the project.
- Monitor and evaluate the effectiveness of the approaches and methods of the HiCUB project team in a manner that allowed for continual improvement throughout the lifespan of the project.
- Monitor and evaluate the approaches and methods used for revegetation, grassy woodland regeneration and riparian works by contractors, community groups and the HiCUB project team in a manner that allowed for continual improvement throughout the lifespan of the project and in any subsequent work.
- Monitor and evaluate other actions, attitudes, abilities and interactions of communities and council staff that affect biodiversity in urban bushland or aquatic or riparian areas or will affect their choices regarding resources use and sustainability.
- Establish a monitoring and evaluation strategy (based on existing draft documents) which defined baseline measures of ecological health, community capacity and engagement, community collaboration and resource use. The strategy set the direction and methods for the short-, and long-term outcomes of works undertaken by the HiCUB project to be measured.
- Share the lessons learnt from the project with all project participant, regional stakeholders and the broader community.
- Report on project outcomes to the NSW Environmental Trust and other stakeholders.

This monitoring strategy encompassed two overlapping aspects of observation and analysis, and evaluation and interpretation and extends beyond simply collecting baseline data relating to ecological health. Resources (time and expenses) were allocated equally across each of the four (LGAs) and between social and biophysical monitoring.

A summary of the M&E strategy is provided below. Key outcomes identified from the M&E strategy are provided in Section 2.

## 1.1 BIOPHYSICAL MONITORING

Due to the large scope of the HiCUB project, key projects (bushland and riparian) within each of the four Council areas were selected for monitoring. The strategic key projects within each of the local government areas (LGAs) are identified below (**Table 2**). These projects were selected in consultation with the HiCUB project team and feedback sought from the committees on the selected projects.

**Table 2: Key projects in each LGA**

| GUYRA | WALCHA | URALLA | ARMIDALE DUMARESQ |
|---|---|---|---|
| Urandangie Creek restoration | Apsley River Corridor | Uralla & Rocky Creek works | Dumaresq Creek Riparian Works (Stage 1) |
| Guyra travelling stock route | Walcha Woodlands to Wetlands | Mt Mutton bush regeneration | Armidale Bush regeneration |

An M&E strategy was designed to monitor biophysical indicators for each of the key project sites. Each strategy was related to the specific aims of the individual project site as well as the overall HiCUB objectives. The M&E strategies involved two overlapping aspects of observation and analysis and evaluation and interpretation and extended beyond simply the collection of baseline data relating to ecological health. Monitoring generally involved the collection of baseline data (including collating existing data where available) and at least one additional sample following the completion of on-ground works.

Samples were analyzed and interpreted in relation to the spatial and temporal context of the sampling and the works being evaluated. Repeat observations were interpreted both on their own and in the context of earlier results to facilitate the tracking of changes in indicators. Reporting on sampling results and interpretation was provided to the HiCUB team mid-way through the M&E period to facilitate an adaptive management feedback process (**Figure 1**).

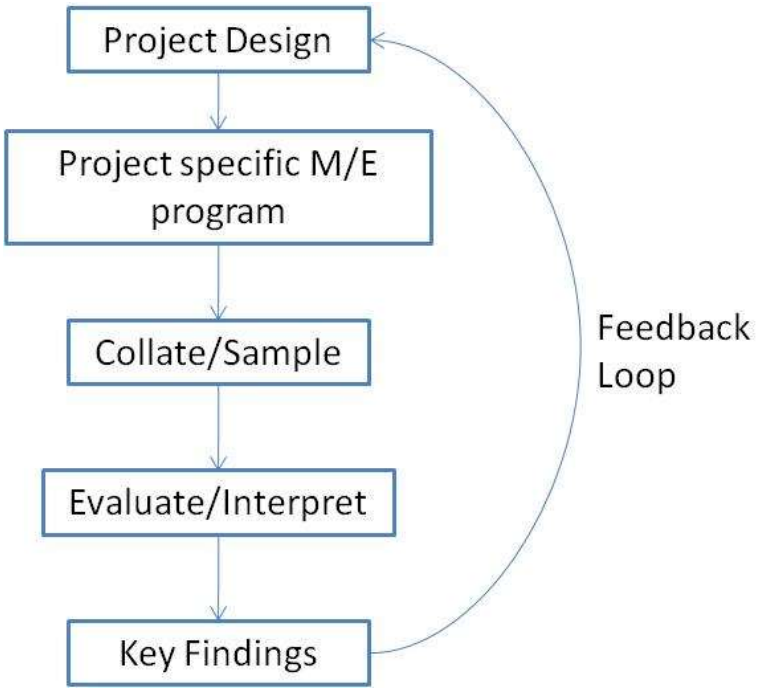


**Figure 1: The M&E feedback loop**

A detailed report for each key project nominated in **Table 2** was prepared (see Appendices). It is noted that no on-ground bush regeneration works were completed at the Guyra TSR during the HiCUB project period. Baseline data collected for this area are included in the monitoring report prepared for the Urandangie Creek rehabilitation works.

A key component of the HiCUB project was community capacity building. Members of the ELA Project Expert Team provided capacity building exercises at strategic points throughout the duration of the HiCUB project. These small-group interactive workshops were aimed at key local members of the community, including SNELC, Armidale Dumaresq Council and representatives from active local groups, to equip them in their understanding of urban biodiversity. Monitoring of these activities was included in the social monitoring strategy (see below).

## 1.2 SOCIAL MONITORING

The monitoring and evaluation of social indicators was undertaken through the appraisal of HiCUB activities related to specific projects via surveys that focused on the attitudes and behaviours of participants relating to urban biodiversity. Surveys that addressed project governance and the broader community were also conducted (**Table 3**). Surveys were administered in all LGAs to collect core data on the attitudes and behaviours relating to urban biodiversity. These broader surveys were implemented during the initial phases of the M&E project to provide formative feedback throughout the life of the HiCUB project.

**Table 3: Summary of the social monitoring approach**

| TARGET AREA | SURVEY TYPE | RATIONALE |
|---|---|---|
| Specific project areas | Activity survey (at activities related to specific projects for each LGA). | Activity-based surveys provide a detailed community profile of people currently engaged in and concerned about urban biodiversity, their attitudes and behaviours and responses to activities.<br>Data were collected at several points over the life of the project and provided a picture of change over time. |
| | Capacity building survey (at capacity building activities related to specific projects for each LGA). | Surveys from capacity building activities were used for evaluation and to provide formative feedback. Data were also used to generate profiles of those engaged in the activities. |
| Project governance and administration | General community survey (developed for online administration and face-to-face interviews with an incentive structure built in to encourage participation). | This longitudinal survey provided for comparisons between those who were engaged and those were not engaged in urban biodiversity to identify reasons and ways by which to encourage more people to become involved. |
| | Advisory committee and Steering Committee surveys. | These surveys were used for evaluation and formative feedback and in particular to identify issues with the connectivity and communication between community partners in the project. |

Data collected through the activity and capacity building surveys were predominantly qualitative in nature. These data were analysed to demonstrate relationships between activity participation and

attitudes and behaviours, repeat activity participation and changes in attitudes and behaviours, as well as social profiles and their relationships to attitudes and behaviours. These data were also analysed comparatively against those collected from the general community surveys.

Data collated provided a profile of those engaged in the activities and the effects of these activities on participants and, through comparison with the data collected from the general community surveys, differences between participants and the attitudes and behaviours of the wider general community were identified.

Outputs from the surveys were used to evaluate project outcomes and to inform more strategic targeting of engagement activities (for example, to recruit participants from sectors of the community who are not already engaged). A second key formative function was to solicit participants' appraisals of activity (both general as well as key community capacity-building activity) success and failure to provide evaluations to activity organizers to facilitate adaptive improvements.

Key outcomes identified from the M&E strategy for the HiCUB project are summarised below.

## 2.1 SOCIAL INDICATORS

Monitoring of social indicators suggest that many of the social outcomes anticipated for the HiCUB project were achieved.

*Effective council/stakeholder collaboration on environmental rehabilitation through shared planning, training and monitoring processes and cooperative work.*

- Overall member satisfaction with committee functioning.
- Broad support within the general community and among participants of HiCUB activities for the roles taken by council and community in planning and designing biodiversity projects.

*Project governance structures that develop mechanisms to encourage project activities that will be sustained beyond the project lifetime.*

- Broad support within the general community and among participants of HiCUB activities for the roles taken by council and community in planning and designing biodiversity projects, and also for the role of the state government in funding such projects.
- Engagement and collaboration with existing groups and areas, in particular Armidale Urban Rivercare Group and Bushcare Volunteers in Armidale.

*A future funding mechanism established and investment partnerships developed to fund the continuation of project works.*

- Funding secured from a participating council (Armidale Dumaresq) for ongoing project site maintenance.

*Increased capacity of the urban community to manage natural resources.*

- Strong place attachment expressed by the broader community and HiCUB project activity participants, with significantly higher reported engagement in tree-planting, picking up litter and volunteering to help an environment group.
- A substantial number of people attended a range of capacity-building project events and highly active volunteer groups. These factors, combined with other outcomes from the surveys, suggest the community has a strong commitment and growing capacity to support future biodiversity projects.

*Participation in urban sustainability activities increased across the broader community and schools.*

- A substantial number of people attended a range of project events, particularly in Armidale and Uralla. The project also engaged with several schools in Armidale and Guyra.
- Proportional growth in engagement in the HiCUB project was evident in the general community over time. There were also slight proportional increases in the number of people engaged in tree

planting, picking up litter and volunteering time to assist a local environment group within the general community over time.

*Increased awareness, understanding and ownership among residents of the natural areas within the towns.*

- Growth in awareness of the HiCUB project in the general community over time.
- Broad community and HiCUB project activity participant appreciation of the seriousness of urban biodiversity loss. There was a slight growth in appreciation of the seriousness of urban biodiversity loss within the general community over time.
- Broad community and HiCUB project activity participant appreciation of the values of areas of urban biodiversity in their towns. There was a slight growth in appreciation in the general community over time for these same values.
- Approximately one half of the broader community and HiCUB project activity participants surveyed visited urban natural areas at least weekly .

*Increased awareness and understanding of the impacts of our resource use.*

- Broad community and HiCUB project activity participant appreciation that human behaviours are the cause of urban biodiversity loss.
- Broad community and HiCUB project activity participant appreciation that human health and wellbeing suffers due to urban biodiversity loss. There was a slight proportional growth in appreciation in the general community over time.

*Decreased unsustainable resource use; increased utilisation of council mulch; increased uptake of rebates for rainwater tanks; and alternative energy technology; decrease nutrient load in town water supply.*

- Widespread adoption of behaviours to reduce nutrient load in the water, particularly use of phosphate free detergent among the general community and HiCUB activity participants.
- Uptake of council mulch was significantly higher for HiCUB participants captured in the general community survey of 2011 than for non-participants. Council data indicates that mulch uptake has increased as a result of the HiCUB project in Armidale and Uralla.

*Implementation of innovative mechanisms developed by community groups to achieve more sustainable use of resources.*

- Two new initiatives, the Community Garden (initiated by the community) and City2Soil (implemented by Armidale-Dumaresq Council) have been recently introduced in Armidale.

*Increased community engagement in mechanisms to achieve increased sustainable resource use.*

- HiCUB participants were more likely than non-participants to point out the environmental consequences of someone's behaviour and contributing financially to environmental organizations.
- Adoption of walking and cycling instead of driving was high but reported usage of public transport was low.
- Most respondents indicated that they already composted their vegetable waste or owned a compost bin, suggesting that the City2Soil initiative is likely to have community support

Similarly, most respondents also reported that they purchased locally grown produce at least sometimes, which suggests that the Community Garden also has support.

## 2.2 BIOPHYSICAL MONITORING

Monitoring of urban riparian and bushlands, and the rehabilitation works undertaken as part of the HiCUB project indicate that a number of the anticipated outcomes were achieved.

It is clear that the limited monitoring time following plantings, weeding or works limits general conclusions and recommendations that can be drawn from the project. It should be noted many of the following outcomes are at least partially anecdotal as controlled statistical design was not possible. Factors such as time and location of planting, planting team, rainfall, frost etc are likely to have a large impact on these results. However, a number of key outcomes were identified, mostly drawn from the Dumaresq Creek Riparian Works project as it provided for a more extensive longitudinal survey.

Key outcomes identified from the M&E strategy are summarised below:

- Lack of soil compaction around tree seedlings was identified as the main reason for poor planting success.
- Excessive mulch application inhibited growth and health of planted groundcover species (such as *Lomandra longifolia*). Excessive mulching also caused the collapse of tree guard cartons which impacted plant growth.
- Incorrect tree guard installation impacted plant growth and survival.
- Evidence of vandalism, including the removal of plants, stakes and tree guards was noticeably higher in highly visible and accessible sites (such as the showcase plantings along the creek line in Armidale).
- Delayed mulch application after tree planting was identified as a possible causal factor for low survival rates at rehabilitation sites within riparian zones due to competition from weeds.
- *Lomandra* spp. survival rates were low, possibly due to severe frosts experience during the 2011 winter.
- Planting trials comparing the auger and Hamilton plantings showed minor differences in planting survival rates, however, auger sites recorded higher average plant health scores and were larger at 12 months.
- Monitoring of riparian plantings indicated:
    - *Casuarina* had the highest average health scores of all genera (including *Eucalytus, Callistemon* and *Lomandra*);
    - *Acacia* species had the fastest growth rates.
- Weed competition (in particular morning glory and river reeds) contribute to lower survival rates of tree plantings.
- Tree plantings with lower planting densities, spacing of at least one (1) metre, appeared to have higher survival rates than higher density plantings.
- While bush regeneration reduces the count and cover of weds, ongoing maintenance is required to remove weed seedlings that establish soon after works are completed to reduce the further spread of weeds.
- Bush regeneration works saw an increase in native species ground cover (within six months).

The M&E component of the HiCUB project was not commissioned until September 2010, 18 months after the commencement of the HiCUB project. Project works were also delayed in either commencing or completing (in part due to wet weather over spring/summer 2011).

These delays had several effects:

- There was generally insufficient time for monitoring of any condition change that may be attributed to the HiCUB on-ground project works. For example most riparian works were only completed in early 2012 with monitoring undertaken within one to four weeks within completion of works. It is unlikely that any immediate improvements to water quality could be expected from the works within that time period, and less likely that any changes would be discernible in the following post-works monitoring.
- Monitoring of the effectiveness of the committee structure and effectiveness would have benefitted from information on these committees in the very early stages.
- The ability of the M&E program to evaluate fully the approaches used to rehabilitate urban areas was limited, as was the ability of the M&E program to provide formative feedback (for both social and biophysical aspects). In turn, the ability of the HiCUB project to implement changes to improve the approaches and methods used for on-going improvement through the life of the project and beyond was constrained.

**Recommendations and conclusions**

Given the timeframes of the HiCUB project, significant improvements to the ecological condition of urban riparian and bush lands were not expected. However the on-ground rehabilitation works that were undertaken during the project are likely to improve the overall ecological of those areas at a local scale. The impacts of on-ground and in-stream rehabilitation works will also continue to be seen as the systems respond the altered state. The baseline data collected during the M&E program and methodology established should provide the framework for the on-going assessment of the rehabilitation approaches used during the HiCUB project. Future monitoring of the effectiveness of works would be beneficial. Funding has been allocated to complete additional monitoring of riparian works in the Uralla and Urandangie Creeks and the Apsley River in spring 2012. However, we recommend that longer-term monitoring be undertaken to document ongoing change and provide feedback for future ongoing works and refinement of rehabilitation practice.

It is likely that the social impacts of the HiCUB project will persist for several years and perhaps beyond.

# EMBEDDING SUSTAINABILITY

HiCUB has contributed to the incorporation of sustainable practices in both Council and community organisations. The structure of HiCUB, with a community organisation managing the project on behalf of 4 councils, proved both an advantage and a disadvantage. The advantage was that SNEL staff are able to view Councils from the outside, and target unsustainable practices and that they are closer to community organisations. The main disadvantage is that being outside Council it is hard to have an influence or to understand the complex structures and hierarchies within Councils.

We ran a survey with both Uralla and Armidale Dumaresq council staff using a format we borrowed from the Tweed-Byron Bush Futures project (see appendix 6a). The survey looked at sustainability practices and understanding among council staff. These surveys identified training needs for different sectors of council and SNEL will follow this up with all 4 participating councils in the near future.

In the accompanying video report (35 mins), Tom O'Connor (chair of the Steering Committee and General Manager of Uralla Shire Council) points out that the partnership between Councils and SNEL to deliver HiCUB has shown that Councils need support around them to deliver sustainability. This support comes about through all stakeholders working cooperatively and HiCUB has set up the communication, mutual trust and infrastructure to enable this to occur.

In the same video (10 mins), David Steller (Armidale Dumaresq Council) points out that many people in the community have an increasing awareness of the environment and want to do something about it. HiCUB has enabled Council and existing community groups to harness this desire by giving people an opportunity to do something to fix the environment. The project has strengthened the capacity of existing groups by providing tools, materials, equipment and training and by attracting new members. HiCUB has also raised the awareness of the community about how they can increase sustainable practices both in their own home and in the community.

## DELAYS/DIFFICULTIES ENCOUNTERED

Any three year on-ground environmental project of the scale of HiCUB will be difficult to deliver successfully. On-ground works require a long lead time to find and prepare sites, collect seed and grow seedlings, find a planting or work time and follow up to complete works. The structure of the USP, which required a one year planning phase followed by two years of implementation, made this time frame even tighter. With two very wet years, we encountered major delays, which in the end, could only be rectified by a project extension.

As our project was a continuation of over 30 years of environmental work in this area, we had projects ready to go from day one, and it was frustrating not to be able to start all these until the business plan was completed (although the Trust did give us some leeway to start 2 projects early). While we support the planning phase built into the USP, we believe that there should be more flexibility to enable projects to start in the first year for a number of reasons:

1. On-ground works is the best way to get people actively engaged in the project,
2. Starting early mitigates against the risks of delays due to high or low rainfall,
3. On the Northern Tablelands we have short growing seasons due to the climate, so it is important to make the most of them.

Implementing a project of the type and scale of HiCUB across two very wet years has had both advantages and disadvantages. The advantage has been that all tree planting activities have been extremely successful, with high survival and good growth. The soil at our plantings sites was moist and soft, so that no extensive site preparation (such as ripping or mounding was required). The soft soil made planting much easier and quicker, which made public planting events easier and more fun. We initially started using a mechanical auger at these events (noisy and slow), but soon moved on to using hand tools (Hamilton Planters) after a comparison trial.

The wet weather however, caused major delays in our riparian works program. Early in the project, we were able to complete half of one major project in the Uralla sub-catchment. This included rock revetment and construction of a small rock flume. Other projects were not ready to start until spring 2010 because of planning, permits, calling for tenders or design processes. From spring 2010 to the end of summer 2012, we had rainfall significantly above the long term average, with several severe floods and very wet ground throughout. This delayed the projects in the Apsley River in Walcha, Uralla creeks, Dumaresq Creek in Armidale and Urandangie Creek.

For example, one site at ‘The Glen’ in Uralla had a small, active head cut in a gully. Plans prepared by Soil Conservation Service in Feb 2010, suggested a small diversion bank be built to divert water away from the gully. By the time we were able to get machinery anywhere near the gully (Feb 2012), the gully had cut 5m down and 15m back and was threatening to erode the main northern railway line. What was originally a $1500 job was going to cost $55000. In the end we have been able to convince John Holland (maintenance managers for the northern railway line) to undertake the repair works based on designs prepared by HiCUB.

Work on the Apsley River project, which is mostly within the levee banks in the town could not be fully planned until detailed survey of the river channel was undertaken. This work was delayed for several months because the river was too high until Dec 2010. The project was then delayed further because of three minor floods and high river levels throughout 2011. When the work finally commenced in Dec 2011, it took 5 months to complete (during this period work stopped several times with high water levels and rain), but had been delayed for at least 16 months. delays

As a result of the rain, we applied for and were granted a 3 month extension on the project. The drier weather since February has enabled us to complete all of our riparian works to a high standard.

The only other delay or difficulty worth highlighting here is the difficulty in engaging the communities in small towns in environmental works. We initially set ourselves targets of establishing one new community group in Walcha and Guyra and increasing participation in Uralla and Armidale. While we succeeded in the latter, we found it very difficult to engage the communities in Walcha and Guyra, through activities promoted to the

general community. We initially started advertising events in the paper, on posters and through letterbox drops, but had low turnout at these events. After this we switched to targeting existing community groups including service clubs, garden clubs, sporting clubs and businesses.  This method proved much more successful with more people attending events where they were auspiced by an existing club. For example, in Guyra we ran several activities with the Guyra Bowling and Golf Club, with both members and staff participating.

Monitoring and evaluating on-ground change from a short term project such as this is difficult. Changes in water quality, fauna populations, weed burdens, planting success and ecological health take many years to occur in response to works. The impacts of the HiCUB project will not be fully felt in some areas for 100 years or more (when the hollows develop in the eucalypts planted along creeks). The Trust should consider ways to fund monitoring for a period of at least 2 years after a project is completed to pick up some detectable changes, such as improvements in macro-invertebrate populations in streams.

## MODIFICATIONS

Apart from the delays in the project due to the weather mentioned in the previous section, the only modifications made to the project were minor.

In their final format, Biodiversity Plans were less formal than originally envisaged. The Councils expressed the wish that these plans guide future projects and assist with applications for grant funding, rather than be formal council policy documents. Management plans for important sites were produced separately from the Biodiversity Plans, as they have been actively used and adapted throughout the HiCUB project.

Throughout the life of the project there was tension between the expectations and priorities of different groups within HiCUB, such as the Advisory Committee, Steering Committee, town working groups and the HiCUB project team. These were almost always resolved by negotiation and communication or, in rare cases, by a decision of the Steering Committee. In some cases, the HiCUB team was required to make pragmatic decisions in order to complete the project within objectives and budget and on time.

The work on the Creeklands in Armidale is an example of a change in project priorities. Originally, the Advisory Committee had suggested a large wetland in the main urban park in town, built from a small gully feeding Dumaresq Creek. This would have provided a very high profile project in the centre of Armidale and was popular with the community. After the HiCUB project team was appointed, the project was evaluated against the project objectives, and found to be not making a significant contribution to riparian health or biodiversity and not to have opportunities for community involvement. An additional complication was the presence of highly contaminated soils, with concomitant risks of higher costs and longer time to complete. An alternative project was developed with the Armidale working group and Technical Advisory Group, then discussed with and approved by the Advisory Group and Steering Committee. The resulting project achieved project objectives, was highly visible and had strong community involvement and support.

The original Business Plan included a component for increasing the uptake of sustainable practices by the community, including increased use of incentives to do this. Very early on in the project, we realised that there were already many new projects and activities in the community that had the same objective. Rather than duplicate the effort we decided to support other initiatives. We principally achieved this by becoming an active member of the Executive of the New England Sustainability Strategy (also supported by the NSW Environmental Trust). We also promoted other schemes through the HiCUB communication channels (email newsletter, web pages and weekly column in The Independent). Both the ‘Summary’ and the ‘Monitoring and Evaluation’ chapters of this report describe how this objective was met.

# TIMETABLE

| | |
|---|---|
| Original project completion date | 28th January, 2011 |
| Original final report submission date | 28th February, 2012 |
| Extension project completion date | 28th April, 2012 |
| Extension project final report submission | 11th June, 2012 |

# PERMITS OR APPROVALS

The following permits or approvals have been obtained during the project:

| **Permit** | **Project** | **Date** |
|---|---|---|
| EPBC Act, 1999 Referral | Mother of Ducks Lagoon works | 23/8/2011 |
| Fisheries Management Act, 1994 Permit | Uralla Creek works (obtained by Brett Hanly, Soil Conservation Service) | July 2011 |
| Fisheries Management Act, 1994 Permit | Dumaresq Creek rock revetment works (obtained by David Ward, Armidale Dumaresq Council) | March 2012 |
| Development Application | Uralla Creek Works Stage 2 | September, 2011 |
| Development Application | Apsley River Corridor project (submitted by Gerry Moran, WSC) | August 2011 |
| Development Application | Mt Mutton, Uralla bush regeneration works. | March 2011. |
| Controlled Activity Approval | Urandangie Creek Works | 2/2/2011 |
| PERMITS UNDER PARTS 2 & 7 OF THE FISHERIES MANAGEMENT ACT 1994 | Apsley River & Walcha Woodlands | Dec 2011 |

## FINANCIAL STATEMENT

Please see Appendix 7

## VISUAL DOCUMENTATION

Please see Appendix 8 and the photo galleries on the HiCUB website at http://hicub.org.au/project/?page_id=867.