

## BUSHCARE SUPPORT 2003

# *Native Vegetation Management*

*A needs analysis of regional service delivery in Queensland - Wet Tropics*

growing the future together



# WET TROPICS

## Regional context

### Regional profile

The Wet Tropics Bioregion is 1.85 million hectares in size (WTMA, 2001). It contains 30 per cent of the entire vascular plant diversity of Australia in only 0.26 per cent of the continent's area. The Wet Tropics also contains 32 per cent of Australia's terrestrial vertebrate fauna (Williams et al, 1996). Approximately half of the bioregion contains significant vegetation communities. Of the total 105 distinct regional ecosystems 23 per cent are classified as 'endangered' and a further 16 per cent as 'of concern' (Sattler and Williams, 1999). Eighteen of the 24 endangered regional ecosystems occur as fragmented remnants on the coastal lowlands and the remaining six are from basalt landscapes on the Atherton Tablelands. The 17 'of concern' regional ecosystems include community types that were once extensive but have been widely developed for agriculture, and also several open forest systems that have been rapidly changed due to altered fire regimes (Goosem et al, 1999).

The Wet Tropics region has exceptional biological richness and significance and is recognised as a major world centre of plant and animal diversity. It has the highest level of biodiversity and regional endemism within Australia and is characterised by large areas of mountainous ranges, wild and scenic rivers, intensive agriculture on rolling uplands and coastal floodplains, significant coastal wetlands, offshore coral reefs and a monsoonal climate (natural resource management Board, 2000).

### Current land use

Principal land use and industries are sugar cane (lowlands and tablelands), bananas (mostly lowlands south of Cairns), grazing (beef and dairy – lowlands and tablelands respectively), and tourism (major centres north of and around Cairns and the Atherton tablelands). To a lesser extent, maize, exotic fruits, vegetable crops, farm forestry and aquaculture ventures occur but and are geographically widespread. In addition, large areas of crown land around the town of Cardwell have been planted with the exotic *Pinus caribea* by Queensland Forestry. Forestry also manages plantations of varying floristic structure in other regions of the wet tropics.

The region is divided into ten local government areas with a combined population of 317,814 (at 1996), and a population growth of 1.5 per cent (1998-99 figure) (Goosem, 2001).

### Natural resource management planning

Natural resource management planning in the Wet Tropics region follows the major catchment boundaries, which include the Herbert, Tully/Murray, Moresby, Johnstone, Russell, Mulgrave, Barron and Mossman/Daintree Rivers as well as the Trinity Inlet (Cairns) and the eastern fringe of the Mitchell River Catchment. This region differs to the bioregion definition of the Wet Tropics region because it includes the entire Herbert River catchment, encompassing the north-eastern part of the Einasleigh Uplands Bioregion.

## Key Statistics

A total of 115 Natural Heritage Trust projects were funded between 1997 and 2001 in the Wet Tropics region. Some of these projects received recurrent funding over several years (these repeat projects have only been counted once). A breakdown of these projects follows.

Project description	No. of projects in region	Percentage of total
Revegetation or restoration of vegetation remnants	54	73%
Remnant protection	11	15%
Other projects	9	12%
Total number of vegetation management projects	74	100%

### *Greening Australia project assistance*

Greening Australia's Bushcare Support has provided assistance to 41 (55%) vegetation management projects between 1997 and 2000. Project assistance provided includes:

- project planning, design and implementation;
- survey of suitable species and where to source seedlings;
- project maintenance, monitoring and evaluation design, implementation and review; and
- technical advice to technical assessment panels and regional assessment panels, and to devolved grants projects.

In addition, Bushcare Support officers received 333 non-Natural Heritage Trust queries between 1997 and 2000 that were related to:

- vegetation management, revegetation and remnant vegetation protection;
- interim funding project proposals;
- the new Wet Tropics Regional Strategy; and
- the regional vegetation management planning committee.

Training opportunities provided by Greening Australia's Bushcare Support included 33 training events involving 565 participants. Topics covered included:

- plant identification
- seed collection and plant propagation;
- nursery techniques, hygiene and management;
- mahogany glider habitat;
- remnant vegetation protection; and
- reptile field day (habitat identification and protection).

Participants included Bushcare project proponents, Land for Wildlife members, Landcare groups, schools and the general public.

Only one request was received for the provision of educational work in schools.

One project covered ten training events (not included in training opportunities above) across six schools with 126 students participating. The program was aimed at schools on the coastal floodplain where the endangered Mahogany Glider and its endangered habitat occur.

## Existing resources and infrastructure

### Nurseries

Nursery	Capacity	Comments
Atherton Shire Council (formerly part of Wet Tropics Tree Planting Scheme-WTTPS)	5,000	Holding facility – natives for environmental revegetation (tubestock; 560ml). No major production facility. Annual production. Tools and machinery. Works in conjunction with Eacham Shire Council nursery. Strict provenance regulations. No Quality Assurance (QA).
Cairns City Council (formerly part of WTTPS)	25,000 - 30,000	Production and holding facility - natives for environmental revegetation (tubestock; 560ml). Also supplies Treeforce, Cairns Urban Landcare and CJP group projects. Annual production. Tools and machinery and office. Provenance unregulated. Limited QA.
Cardwell Shire Council (formerly part of WTTPS)	25,000 - 30,000	Production and holding facility - natives for environmental revegetation (tubestock; 560ml). On-sell to community. Annual production. Tools and machinery and office. Provenance guidelines. Limited QA.
Cook Shire Council (formerly part of WTTPS)	10,000	Although out of region the shire nursery works in the Bloomfield catchment. Nursery requires upgrade to improve hygiene and production facility. Annual production. Tools and machinery and office. Limited provenance guidelines. No QA.
Douglas Shire Council (formerly part of WTTPS)	25,000	Only nursery in Wet Tropics region with the ability to produce native mangrove species. Annual production. Tools and machinery and office. Strict provenance regulations. Recent QA.
Eacham Shire Council (formerly part of WTTPS)	35,000	Production and holding facility - natives for environmental revegetation (tubestock; 560ml). Annual production. Tools and machinery and office. Provenance sometimes unregulated. Limited QA.
Herberton Shire Council (formerly part of WTTPS)	5,000-10,000	Small-scale production and holding facility - natives for environmental revegetation (tubestock; 560ml) + bags. Annual production. Tools and machinery. Strict provenance regulations for large projects. No QA.
Johnstone Shire Council (formerly part of WTTPS)	25,000 – 30,000	Production and holding facility - natives for environmental revegetation (tubestock; 560ml). Annual production. Tools and machinery and office. QA – has potential for nursery accreditation.
Mareeba Shire Council (formerly part of WTTPS)	20,000 – 25,000	Holding facility - Unsure as to current operational status – dependent on funding and on-ground works program. Annual production. Tools and machinery and office. No QA.

Nursery	Capacity	Comments
Coastal Community Cassowary Committee (C4)	5,000 - 10,000	Restricted to supplying revegetation works in Mission Beach area. Annual production. Office, some tools. Strict provenance regulations. Limited QA.
Yuruga Nursery	unknown	Commercial wholesale and retail operation. Tubestock and pots. Annual production. Office. No provenance regulation. Strict QA (accredited nursery).
Centre for Tropical Restoration – (QPWS – CTR)	25,000 – 30,000	Production and holding facility - natives for environmental revegetation (tubestock; 560ml). Annual production. Tools and machinery and office. Strict provenance regulations. Strict QA (accredited nursery)
Daintree Cassowary Care Group	unknown	Work in conjunction with Douglas Shire Nursery. Annual production. Tubestock. Strict provenance regulations. No QA.
Several Small family run nursery businesses	unknown	Commercial nurseries – small supplier of natives often sold at local markets (small selection of local species). Annual production. Various levels of infrastructure, generally with limited tools and machinery. Provenance unregulated. Various QA (some nurseries may be accredited).
Walkamin Nursery (DPI)	unknown	Vic pots. Annual production. Forestry operations and commercial nursery. No provenance regulation. QA.
School for Field Studies (top of Gillies Hwy)	5,000	Small-scale nursery – mainly stock for local creek revegetation in cooperation with local community groups (tubestock; 560ml). Annual production. Tools and machinery and office. Provenance guidelines. Strict provenance guidelines. Limited QA.

*Note: generally the shire-based, CTR and C4 nurseries concentrate on adhering to strict provenance guidelines for biodiversity-based projects; whereas commercial based nurseries place less emphasis on provenance and species integrity.*

### Technical/operational expertise

There are a limited number of people in the region with key skills – particularly in the areas of practical natural resource management and implementation (i.e. field botanists, ecologists, revegetation practitioners). Generally, those practitioners employed in the local government-based revegetation nurseries have high skill levels and many have been involved in environmental rehabilitation in the wet tropics for 14 years. To date, this has been poorly recognised within the industry, as local government rarely provides dedicated resources for promotion of council departments. Nevertheless, this is not indicative of skill levels in ecological restoration, and for the most part, is misleading. The fact still stands that local government has realistically contributed to the reinstatement of several hundred hectares of highly degraded land during this period. Arguably, techniques, quality and planning have greatly improved since the inception of the Natural Heritage Trust.

Centre for Tropical Restoration (CTR), a collaboration between the community group, Trees for the Evelyn and Atherton Tablelands (TREAT), and the Queensland Parks and Wildlife Service (QPWS) nursery at Lake Eacham, on the other hand has developed a strong promotional presence in the region and elsewhere. State Agency support from QPWS and high community representation has allowed for much higher levels of marketing, promotion and interpretation. Such resources are not freely available to local government. The quality of work from both entities is of the same standard and there is no published data to suggest that either party produces greater biodiversity outcomes through their respective work programs.

In terms of technical advice provision, the recent closure of North Queensland Afforestation Association has left local government with no dedicated assistance with guidance for revegetation projects. In the space of only four months, technical assistance to local government has dropped to such a degree that no quality assurance exists for new and continuing on-ground projects. The ramifications of this are becoming obvious – with less attention being paid to species provenance and integrity; misguided application of the use of specific plants for specific purposes and a general decline in interest for undertaking ‘big picture’ revegetation projects. In addition and importantly, less and less emphasis is being placed on biological monitoring and evaluation. The major contributing factor to this aspect of overall apathy is the lull and uncertainty associated with the future of Natural Heritage Trust funding (this was highlighted in Gleed, 2002).

Local government is hesitant in progressing towards a formulated monitoring and evaluation program in the absence of dedicated funding and human resources. From a local government perspective, a strong emphasis was placed on securing an external body to undertake monitoring and evaluation of Natural Heritage Trust funded projects. This would allow the revegetation units to concentrate on on-ground cost-effectiveness, and biological quality and integrity.

An independent survey to examine the monitoring techniques of environmental community restoration projects included twelve Bushcare projects on the Atherton Tablelands (Hochman, 2002). It showed that only half of the projects utilised monitoring techniques other than photo points and these were carried out by either government agencies or external consultants. The major constraints for community groups using more in-depth flora and fauna monitoring were identified as the lack of, time, expertise, incentives and personnel.

### **Commercial organisations and individuals**

A list of 12 commercial organisations (see Attachments) was extracted from the Cairns District Yellow Pages (2002/2003) however this does not imply expertise in any given area. In addition there are other individual consultants not listed that subcontract botanical and ecological fieldwork to recognised practitioners in the area. These organisations have had little if any involvement in Natural Heritage Trust funded vegetation management projects.

### **Direct seeding infrastructure**

Direct seeding infrastructure is uncommon in the region, as this method is not deemed effective or appropriate for restoration of closed forest communities. Herberton Shire Council, through the WTTPS, has used direct seeding effectively on road verges and to reclaim fill areas of the Herberton tip. In both instances, this method has proved successful in reclaiming dry and highly degraded areas. Herberton Shire Council only uses local native species (mixed Acacia and Eucalyptus thickets). Mareeba Shire Council, also through WTTPS, has also undertaken some direct seeding work in similar environments.

A commercial venture – Revegetation Contractors, has been in operation for several years in the region. This organisation does not solely or strategically use native species and incorporates various exotic grasses (Japanese Millet, Vetiver etc) with off-provenance sclerophyll species (Acacia spp., Eucalyptus spp., etc) in its works. Direct seeding is applied through hydro-mulching technology with varying levels of success. Revegetation Contractors have commercial contracts with departments such as Main Roads.

### **Vegetation management training opportunities**

Specific training is deemed critical in the region. Opportunities exist within local government, particularly if well coordinated and structured towards current needs. Several training providers operate in the region, but few have the capacity and knowledge to deliver contemporary vegetation management training.

The current Green Corps training program, although aligned to conservation management and application is governed by a set curriculum, which is not necessarily appropriate for the wet tropics region. The use of skilled trainers with contemporary vegetation management knowledge is critical if this program is to dovetail into existing work programs within the revegetation industry.

Several Natural Heritage Trust funded community groups have carried out vegetation management training workshops, specifically related to project objectives.

### **Current provision issues**

Technical advice - Technical advice is thin on the ground, geographically widespread and under staffed. There are very few field botanists with knowledge of contemporary ecological restoration application, similarly field ecologists.

Knowledge of seed provenance – There is only one dedicated seed collector in the region, who is connected with TREAT/QPWS. Other groups collect seed in an opportunistic matter. There are issues with off-provenance seed collection and introduction of alien genetic material to sensitive areas.

Project planning services to community is low key and based on assistance requested. The same also applies to ongoing and regular community visits. Time and financial constraints are the main contributor to this issue.

No standards for monitoring and evaluation exist within the region. Although many groups and institutions (universities, CRCs etc) are carrying out monitoring and evaluation, no standards or baseline methodology has been ratified by State or Federal Agencies. Generally, monitoring and evaluation is applied in an ad hoc manner and has little community interest. Future monitoring and evaluation programs need dedicated positions and long-term planning and funding.

Most on-ground works and provision of technical advice rely heavily on government funding.

#### *Key vegetation issues*

Highlighted issues as listed in the Wet Tropics Regional Strategy for Natural Resource Management (2000) are:

- vegetation loss, degradation and fragmentation, particularly in the coastal lowlands;
- loss and decline of native species and biodiversity;
- riparian and in-stream degradation through encroaching adjacent land uses, clearing, sedimentation and natural erosion processes;
- land management practices at the individual property level do not accommodate natural values in sufficient representation of specific natural communities in the region's protected area network;
- pest animal and plant impact on natural ecosystems and primary production;
- management and allocation of surface and ground waters;
- failure to implement best practice in all primary industry production methodologies;
- declining water quality due to sedimentation and other forms of diffuse pollution, in addition to disturbance of acid sulphate soils, point source pollution and salt water intrusion; and
- inadequate standards enforced to ensure best practice in waste management.

Other priorities may exist that would either add to above or alter the order of priority. Nevertheless, of particular concern are the following issues.

#### *Vegetation loss, degradation and fragmentation*

The clearing of native vegetation in the region post listing of the Wet Tropics World Heritage Area (1988) totals to 154 hectares with most vegetation being cleared to make way for sugar cane and grazing pasture. Vegetation clearing across the Bioregion has slowed from an average rate of 3,583 hectares per year between 1991 and 1995 to 1,275 hectares per year between 1997 and 1999, but still remains a concern (WTMA, 2001).

The Herbert, Murray and Barron River catchments had the highest total area cleared between 1997 and 1999. This involved clearing 4.48 square kilometres per year for pasture in addition to 7.23 square kilometres per year for crops (DNR, 2000). In addition, clearing between 1992 and 1998 in the Mission Beach area removed an estimated 18 per cent of the total available habitat for the endangered Southern Cassowary, *Casuarius johnsonii* (Moore, 2001). This has dire implications for the forest ecosystems in the area because the cassowary plays an essential part in sustaining a functioning forest ecosystem through its role as a key dispersal vector of rainforest fruits.

There is still no consistent or systematic incentive system offered through local government that encourages vegetation retention across the region and across shire boundaries. At present only the shires of Johnstone, Douglas, Cardwell and Cairns City Council (four out of ten shires) run an incentive program aimed at long-term protection of remnant vegetation. While it is possible that other shires are involved or are likely to be involved with similar incentive systems, the number of participatory shires able to demonstrate outstanding results through such incentives is small, even in light of the region's outstanding levels of species endemism and biodiversity.

Vegetation and species assemblages referred to above are invariably considered within the closed and protected reserve systems of National Parks, Crown Land and other protected areas. Consequently only vegetation that can be readily identified as a recognised endangered or of concern regional ecosystems are afforded legislative protection (assuming the vegetation is not constrained to a designated protected reserve). This clearly suggests that the virtues and indeed the biological as well as aesthetic values of so-called regrowth vegetation have yet to be realised, notably by State and Federal Government and the agencies that underpin the environmental faculties. In many instances, the only protection afforded to regrowth may be a locally adopted Vegetation Protection Order or at the very least, a Tree Preservation Order. This is not to suggest that such bylaws are worthless. Moreover, they demonstrate that they are virtually the last stand when it comes to saving regrowth vegetation or even isolated trees before the end-point of grass-roots community action (in a last ditch attempt to save what is locally perceived as a valuable natural asset).

The values attached to native vegetation per se are coincidental with the level of knowledge of any given vegetation assemblage. The knowledge, and subsequently the values placed upon regrowth vegetation are insufficient and inadequate at present to ensure its protection. Ironically, as practitioners, scientists and the participating community move towards implementing wildlife corridors and so on, regrowth vegetation is given scant regard considering it is more or less the mainstay of native vegetative linkages between protected areas. Hence, any zero net loss of native vegetation policy within local government is commendable. However, it is critical that local government, at least, recognise the values of regrowth vegetation and concurrently maintains a credible, appropriate and planned revegetation program to complement regrowth and protected area vegetation.

#### *Pest plants and animals*

Wet Tropics Management Authority (WTMA) (2001) notes that the number of environmental weeds (naturalised species that enter and disrupt natural systems) in the region has increased. The Authority has identified 27 terrestrial and seven aquatic species that are of particular concern. Several of these environmental weeds pose major problems to the efficient long-term management of remnant vegetation and also restoration projects throughout the region. These include;

- *Annona glabra* (Pond Apple)
- *Hymenachne amplexicaulis* (Hymenachne)
- *Turbina corymbosa* (Turbina, Christmas Vine)
- *Sphagneticola trilobata* (Singapore Daisy)
- *Senna obtusifolia* (Sicklepod)

Disturbed ecosystems such as cyclone damaged communities, previously logged forests and rainforest margins are particularly susceptible. The WTMA also recognises that one of the greatest needs in combating pest problems involves obtaining sufficient resources to support a comprehensive program to control the most pressing problems in partnership with stakeholders including all levels of government and the wider community.

Further to the impact of weeds on remnant vegetation are the problems of escaped weeds of urban areas and their deleterious effect on native vegetation reserves within these landscapes. As well as *Sphagneticola trilobata* and *Senna obtusifolia* mentioned above, urban landscapes have become a stronghold for numerous new or potential environmental weeds. Species such as *Syngonium podophyllum*, *Allamanda cathartica*, *Zebrina pendula*, *Eugenia uniflora* are just some exotic species amongst many that are taking heavy tolls on the fringes of urban remnants and regrowth.

Of the feral animals, pigs are a major problematic species, not only to natural systems but also to agricultural lands. Naturally cats, dogs, fish (Tilapia), birds (minar birds) all contribute in varying degrees to losses of biological integrity and ecosystem condition.

#### *Regional response to vegetation management issues*

A very large number of groups including government agencies, organisations and voluntary community groups are involved in vegetation management issues in the region. The following table provides a summary of these groups.

<b>Agency / Group / Organisation</b>	<b>Activity</b>
Local government revegetation crew (previously the Wet Tropics Tree Planting Scheme-WTTPS)	Restoration and revegetation projects Landholder education Remnant vegetation management through voluntary agreements in cooperative projects Weed management within shire boundary Land for Wildlife (not all shires)
Centre for Tropical Restoration (QPWS)	Restoration and revegetation projects Landholder education Remnant vegetation management through voluntary agreements in cooperative projects
Greening Australia Queensland Inc.	Technical advice via Bushcare Support (re: vegetation management, restoration and rehabilitation)
Trees for the Evelyn and Atherton Tablelands (TREAT) Tree Kangaroo and Mammal Group Landcare and Catchment Management Groups	Restoration and revegetation projects Landholder education Remnant vegetation management through voluntary agreements in cooperative projects
Department of Natural Resources and Mines	Voluntary management agreements Land Act
Environment Protection Agency	Nature Refuges and Voluntary Conservation Agreements on freehold land, Nature Conservation Act Bushcare facilitation
Local government	Incentive programs (Johnstone, Douglas, Cardwell Shires and Cairns City Council) Tree preservation by-laws Vegetation management of council reserves
Department of Main Roads	Revegetation of road verges

## **Gaps and recommendations**

### **Seed collecting**

There are very few knowledgeable seed collectors in the region particularly in local government sectors. Most community groups source their revegetation stock from either Centre for Tropical Restoration (QPWS) or from the local government nurseries. As such, most seed (except Centre for Tropical Restoration (QPWS) and TREAT) is collected from freehold land, which has its limitations. For example, many collectors will collect what they know and can identify from designated sources. Unfortunately, with no ongoing external technical advice and control, some local government based nurseries have a limited knowledge of appropriate species for revegetation. However practical in-house collecting may be (in the absence of knowledgeable seed collectors), this practice can and does lead to issues of seedling provenance and inappropriate use of species.

Commercial seed collection licenses, issued by Queensland Department of Primary Industries, are required when taking seed from crown land or lands under State jurisdiction. In most cases, this is not a cost-effective situation for many groups. Queensland Parks and wildlife service permits are required when taking seed from National Parks however these are very difficult to obtain.

#### *Recommendation*

1. More dedicated field operators are required in the region to coordinate a rigorous seed collecting operation and provide technical advice for those community groups and local governments that lack the expertise.

### **Lack of technical expertise to cover demand**

Technical advice is lacking in certain areas. In particular technical advice, experienced staff and mechanisms to specifically protect biodiversity values are lacking in the local government sector because most small rural shires lack the funds to create such positions. Revegetation planning infrastructure is now depleted in local government due to the closure of NQ Afforestation Association. A void now exists in the provision of contemporary technical advice, guidance, and monitoring and evaluation. Community groups also need ongoing assistance especially in the present period of uncertainty regarding future environmental funding arrangements. These are fundamental needs that if not addressed, may lead to a general apathy and malaise regarding their environment.

#### *Recommendation*

2. That technical advice and extension be given priority and directed to a broad cross-section of the community and participative organisations. Capacity building, particularly for community groups, property owners and individuals is critical and this should be delivered in a form that is interesting and conducive to further involvement in vegetation management. Technical advice and extension is ongoing and not restricted to time limitations, such as those implicated by short-term tenures of employment. This gap also needs to be addressed at the regional body level prior to the implementation of new projects and on-ground works. That local government is recognised for its role in implementing revegetation programs across respective shires (14 year history). Continued funding and technical support is granted to existing local government revegetation infrastructure.

### **Effective monitoring and evaluation**

This is a key gap that should be critically addressed. Monitoring and evaluation is carried out randomly and is not set against recognised criteria or standards. This often leads to the simple question of “what do we monitor and evaluate?” Coupled to this is a distinct lack of knowledge regarding monitoring and evaluation methodology and practices and the lack of capacity (knowledge, time, money) within many groups to undertake such work in the first place.

### *Recommendation*

3. Appropriately skilled personnel develop and implement a multidisciplinary and rigorous program of monitoring and evaluation for the region. Monitoring and evaluation should be consistent for a period extending beyond two years of a project's life from its inception and data collected should be standardised and stored in a central location, analysed and results then disseminated to on-ground practitioners for the benefit of future works.

### **Region-wide biodiversity mapping**

Resource mapping for natural resource management and planning purposes at a local scale (that is, less than 1:50000) does not exist. The regional ecosystem mapping (1:100000) is inappropriate for such planning purposes.

### *Recommendation*

4. Support regional initiatives to prioritise appropriate scaled biodiversity mapping where this data is lacking and provide appropriate levels of funding.

### **New improved technologies**

On-ground practitioners of vegetation management and restoration with field knowledge and expertise are not given opportunities (due to time and financial constraints associated with Natural Heritage Trust funding arrangements and program structure) to improve techniques and project designs through experimental trials. This type of knowledge resides with a handful of people in the region and some State Government Agency staff. In addition, the WTMA, universities and private consultants possess a high degree of expertise in certain areas, but the flow of such knowledge is not always bilateral or transparent, and is often presented in a form that is unpalatable to field workers.

### *Recommendation*

5. Include mechanisms in future environmental funding arrangements whereby on-ground practitioners with expertise in the fields of vegetation management and restoration are given opportunities to formalise new improved techniques. This would be most effective if tied in to a monitoring and evaluation program.

### **Regrowth vegetation is undervalued and misunderstood**

Efforts need to be made toward interpreting the meaning and value of regrowth vegetation, particularly where the regrowth is either isolated, fragmented or is threatened by external forces. In many instances regrowth vegetation (under current definitions used regionally by the Wet Tropics Management Authority mapping) is well developed and has high conservation values. Often such remnant vegetation is the mainstay of urban native species assemblages – this is particularly true of the urban-rural interface. Many remnants of limited age are afforded very little if any value.

### *Recommendation*

6. Financial support be given to agencies such as WTMA and EPA to develop more appropriate definitions and conservation values for areas of remnant vegetation currently described as regrowth, particularly regrowth of mesophyll forest systems.

### **Research required**

### *Recommendation*

7. Research is required into:
  - long-term sustainability of fragmented ecosystems and appropriate management practices including adjacent land management practices
  - the distribution and effects of weeds on rainforests margins, remnants and disturbed systems

- revegetation methods for particular community types such as Licuala swamps, wetlands and vine thickets
- role and impact of fire in Wet Tropics ecosystems, particularly in relation to suitable fire regimes for different vegetation types; and
- Cost-benefit analysis of various best management practices in relation to primary production including riparian, wetland and remnant vegetation protection.

### Limited resources to cover implementation

Limited resources to implement the great number of plans completed in the region, to enforce controls and policies, provide education and incentives in relation to natural resource management.

8. That recognition of natural resource management, notably the role and practice of all facets of environmental restoration, is given by the Commonwealth and State Governments in an effort to secure long-term interest and employment in the region.

### Key documents

Cairns District Yellow Pages (2002/2003).

Environmental Protection Agency (2002). *Biodiversity Assessment and Mapping Methodology*. Environmental Protection Agency, Biodiversity Planning Unit, Biodiversity Branch, Queensland.

(Also at URL:

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Tracey, J.G., and Webb, L.J. (1975). *Vegetation of the Humid Tropical Region of North Queensland* - (15 maps at 1:100,000 scale + key), CSIRO, Indooroopilly.

Werren, G. (2001). *Environmental Weeds of the Wet Tropics Bioregion: Risk Assessment and Priority Ranking*. Rainforest CRC, Cairns.

WTMA (2001). *State of the Wet Tropics Report 2000 – 2001*. Wet Tropics Management Authority, Cairns.

## Key contacts

Organisation	Contact	Phone
Atherton Shire Council	Bronwyn Robertson	4096 5354
Cairns City Council	Bill Sokolich	4055 1081
Cairns Community Renewal Program	Rachel Small	4032 3699
Cairns and Far North Environment Centre		4032 0001
Cairns Urban Landcare	Greg Honey	4041 2593
Cardwell Shire Council	Paul Devine	4068 3105
Cardwell Shire ICM		
Conservation Volunteers Australia		
Cook Shire Council	Diana Wood	4069 5444
CTR/TREAT	Peter Dellow	4095 3406
C4 (Mission Beach)		
Daintree Cassowary Care Group	Gaylene Sheather	
Douglas Shire Council	Shayne Haywood	4098 2619
Eacham Shire Council	Bronwyn Robertson	4096 5354
Green Corps		
Herberton Shire Council	Saeed De Ridder	4097 6159
Herbert River Catchment Group		
Johnstone Ecological Society		
Johnstone Shire Council	Bart Dryden	4030 2287
Johnstone Shire Volunteers	Bart Dryden	4030 2287
Kuranda Envirocare	Jax Bergussen	
Mareeba Shire Council	Gary Barnes	4030 3992
Mulgrave Shire Landcare Group		
School for Field Studies		
Treeforce	Bonny McFarlane	
Tree Kangaroo and Mammal Group	Scott Burnett	40914262

### Commercial organisations and individuals

The following list was extracted from the Cairns District Yellow Pages (2002/2003) and does not imply expertise in any given area. Many consultants subcontract botanical and ecological fieldwork to recognised practitioners in the area.

Organisation	Address
Australasian Groundwater and Environmental Consultants Pty Ltd.	3/17 Edith St, Innisfail.
Catchment Resources Centre	45 Rankin St, Innisfail.
C and B Group	26 Florence St, Cairns.
Coxen Chemicals	125 Jubilee St, Cairns.
Environment North	Suite 6a, 361 Sheriden St, Cairns.
Ergon Energy	
Esys Consulting	7 Tamarind St, Holloways Beach.
GHD	59 McLeod St, Cairns.
Landline Consulting	14 Marnane Rd, Tolga.
Natural Resource Assessments Pty Ltd	341 Severin St, Cairns.
Revegetation Contractors Pty Ltd	Cairns.
Sinclair Knight Merz	2 James St, Cairns.