The Landholder's Handbook:

JOHNSTONE SHIRE

Living with World Heritage

Australia's Tropical Rainforests
WORLD HERITAGE

Copies of this Handbook are available from:

Johnstone Shire Council
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Innisfail 4860
Ph: (07) 4030 2222

Wet Tropics Management Authority
PO Box 2050
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Natural Heritage Trust
Helping Communities Helping Australia
An Australian Government Initiative

WET TROPICS MANAGEMENT AUTHORITY

Contents

Welcome!

Welcome to the Johnstone Shire and our community. This Handbook is a collection of useful information for property holders living in the Shire.

If you are new to the area, welcome to paradise! We have a great way of life here in the tropics, but it also has some challenges. Experienced local residents, government officers, architects and many others have contributed their ideas to help you get started and make informed decisions as you settle in the district. We encourage you to use the contacts provided in each section and seek out expert advice.

We also hope long-term residents find the information useful, in particular the handy lists of phone and internet contacts.

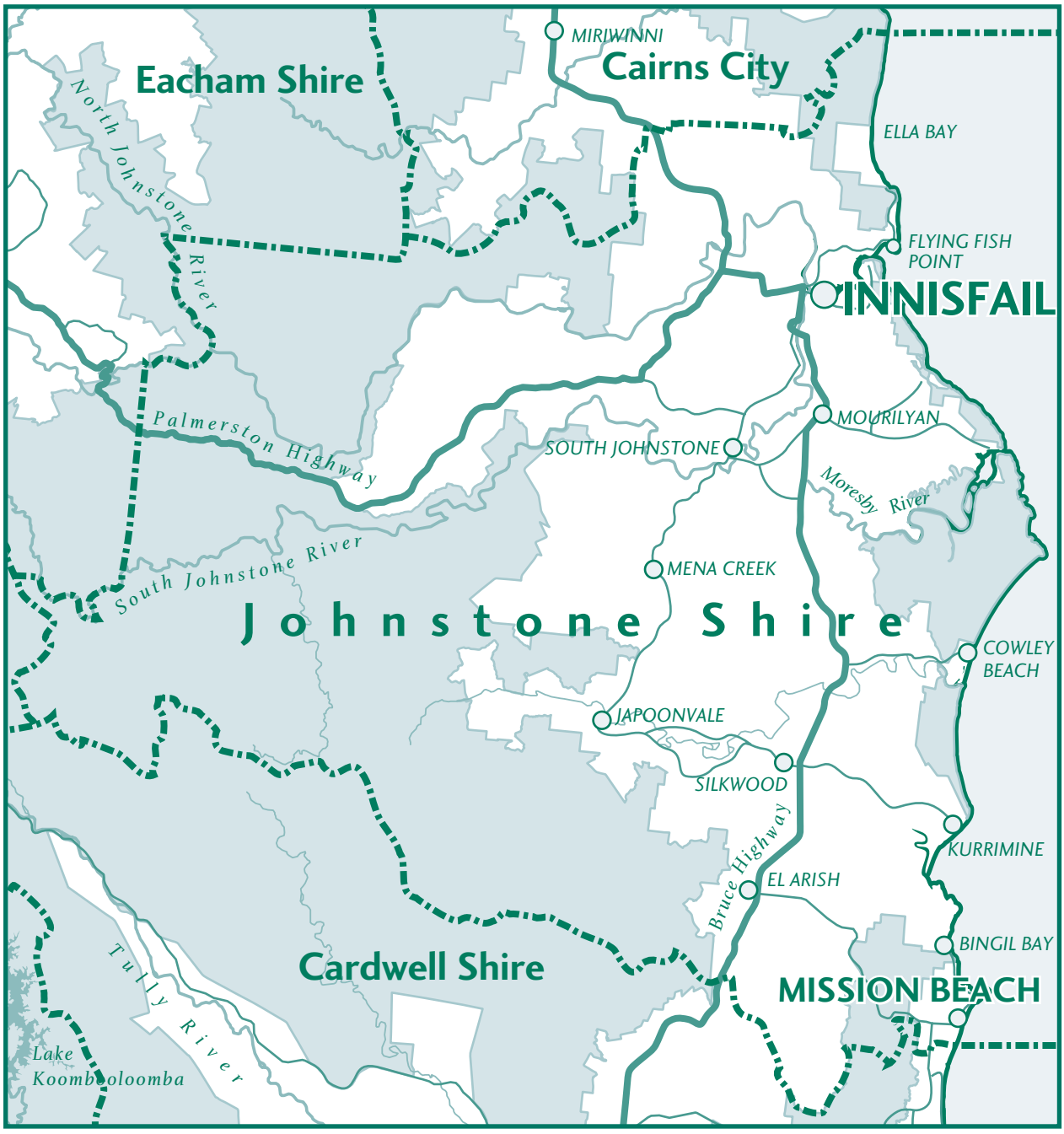
The Handbook was produced as a partnership between the Johnstone Shire Council and the Wet Tropics Management Authority. The Authority is responsible for the conservation and management of about half the Shire which is protected as part of the Wet Tropics World Heritage Area. The World Heritage Area is part of the landscape where we live and work, and provides us with a great quality of life.

The Council is committed to preserving our environment, and conservation is foremost when planning the Shire's development and direction. A sustainable balance between the needs of our residents and the needs of the environment will ensure the Shire's unique qualities are passed on to our children, undiminished.

Cr Neil Clarke
Mayor,
Johnstone Shire

Lt. Gen. John Grey AC (Rtd)
Chair,
Wet Tropics Management Authority

The Johnstone Shire



Legend:

- Shire boundary
- Towns
- Roads
- World Heritage Area
- Rivers

1. Tour of the Shire

Come for a tour and get acquainted with the people, climate and landscapes which make our Shire unique.

Background

The Johnstone Shire extends for about 50 km along the coast from Ella Bay in the north to Mission Beach in the south, and inland almost to the top of the Palmerston Highway. The Shire covers 1,639 sq.km and about half is protected as part of the Wet Tropics World Heritage Area. Most of the World Heritage land is covered in dense rainforest on the steep coastal range, with patches of forest near the coast. Most of the Shire's 20,000 residents live on the coastal lowlands, and about half the residents live in our regional centre of Innisfail.

Climate

The Shire has a tropical monsoonal climate and is one of the wettest places in Australia. The mean annual rainfall is about 4000 mm, with about 70 per cent falling during the wet season (December to May). The mean daily temperature ranges from a minimum of 23°C to a maximum of 31°C. Humidity averages 78 per cent in summer but often reaches the steamy high nineties.

River systems

The Shire's main rivers are the North and South Johnstone Rivers, which begin in high rainfall areas on the Tablelands and flow through steep, narrow gorges to meet on the coastal plain at Innisfail. They have a combined catchment area of about 1,600 sq.km. Rainfalls of over 200 mm in 24 hours in these catchments can cause floods downstream, extending to the coastal plain around Innisfail. A network of volunteers and automatic stations forward rainfall and river height observations to the Council and the Bureau of Meteorology, providing an early flood warning system for the community.

The rivers begin in high rainfall areas on the Tablelands.

Photo courtesy of Innisfail and District Historical Society

The elegant, abstract Art Deco architectural form is featured in the McIlrath building in Edith Street.

In March 1918, Innisfail was battered for over 12 hours by one of the worst cyclones ever recorded. The barometer stopped recording at 27.35 inches (927 hectopascals) and the pressure continued dropping.

The un-named Category 5 cyclone is probably the most intense to ever hit a populated area (certainly much stronger than Darwin's Cyclone Tracy) and is considered among the most severe in Australian history.

It caused extensive damage - but there was a silver lining. Buildings were repaired and reconstructed in the Art Deco style popular at the time. This distinctive architecture has made Innisfail a cultural heritage icon.

World Heritage in the Shire

About half the Johnstone Shire was listed as World Heritage in 1988, and it contains some spectacular features of global importance.

This is the oldest surviving tropical rainforest on earth. The World Heritage Area is a living, breathing museum. There are more primitive plants and animals here than anywhere else on earth. There are examples everywhere in the Shire – such as ancient king ferns, cycads and kauri pines which evolved over 200 million years ago. Over half of the world's 19 primitive flowering plant families are found in the Shire - one of the greatest concentrations on earth.

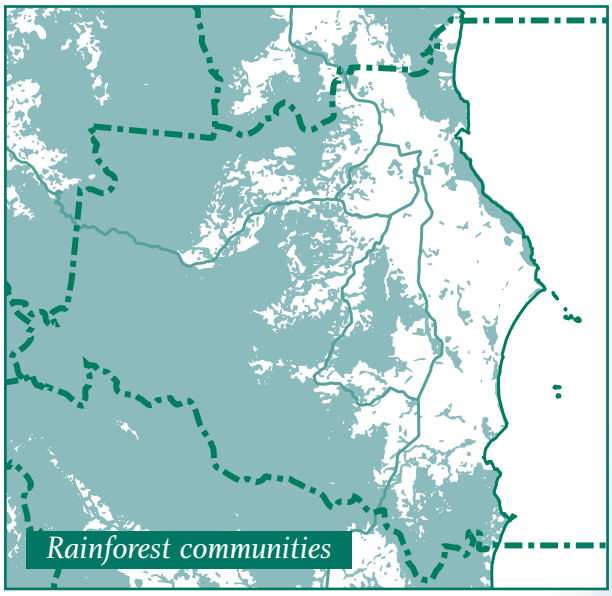
It has exceptional natural beauty. The World Heritage Area's lush mountain ranges provide a magnificent backdrop for our urban and rural lifestyles. On a more intimate level, many of us enjoy rainforest walks in the Misty Mountains, visiting waterfalls along the Palmerston Highway, and exploring the forest-fringed coast around Mission Beach.

It is home to rare and endangered plants and animals. The Council's Biodiversity Strategy lists over 250 rare and threatened plant species and 45 rare and threatened animal species in the Shire. The most famous is the Cassowary. Numbers have plummeted in recent years, and the Shire is one the last places where viable populations still survive.

Its diverse ecosystems are home to Australia's greatest diversity of plants and animals. The Johnstone Shire contains diverse plant communities including rainforests, freshwater swamps, mangroves and open forests. Within these broad groups are many variations, depending on the type of soil and the topography. Scientists have identified 105 different ecosystems in the Wet Tropics region and 48 of them – nearly half of the total, are found in the Johnstone Shire. The Shire has 15 "endangered" regional ecosystems *(less than 10% remains)* and 18 "of concern" regional ecosystems *(10 - 30% remains)*. Another example of the Shire's diversity is in its waterways. The Wet Tropics supports 42% of Australia's freshwater fish species, and the core area for this diversity is the Johnstone and Russell/Mulgrave river systems. Many rare and unique species are found in their rapids and tributaries.

Rainforest

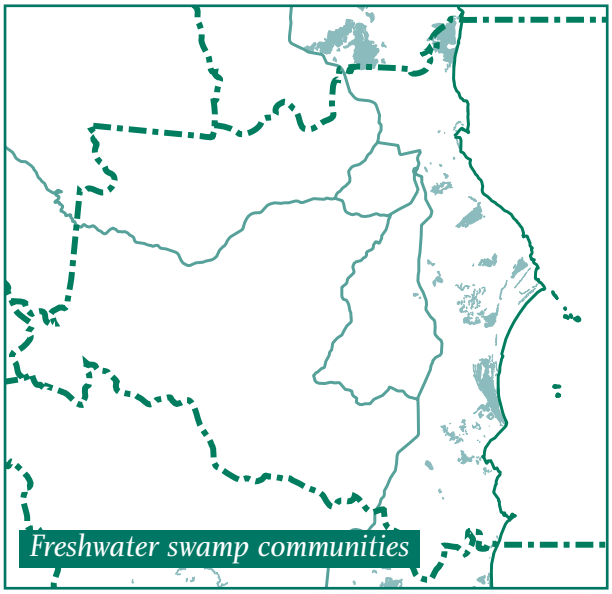
Rainforest is an umbrella term for many different types of forest, and the Shire supports a wide range of these different types. They range from simple rainforests growing on coastal dunes to complex rainforests growing in fertile, volcanic soils. Rainforests such as those in the lower Palmerston area are an example of the most complex, diverse and species-rich forests in Australia.



The Shire's Bulguru swamps are endangered ecosystems.

Freshwater swamps

Freshwater swamps were once common on Australia's coastal plains, but have become rare as a result of coastal development and drainage for agriculture. A good local example is the Etty Bay wetlands in the north of the Shire. Much of their diversity depends on regular fires to regenerate the swamp's reeds, grasses and paperbarks *(Melaleuca)*.

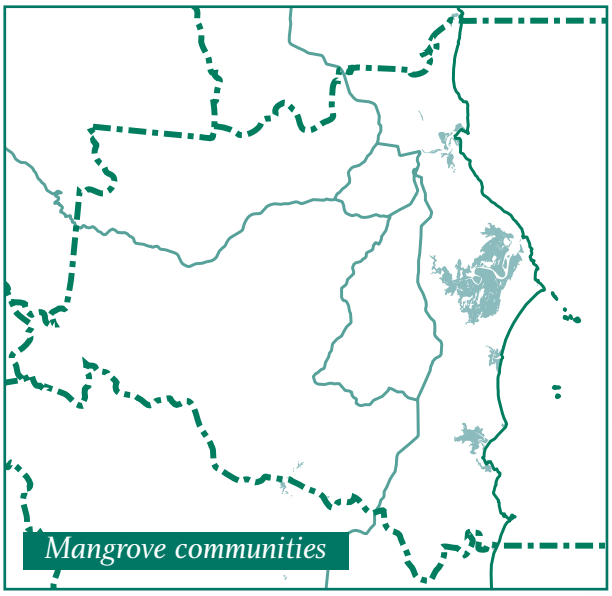


Right: Golden Penda.

Mangroves are significant fish nurseries.

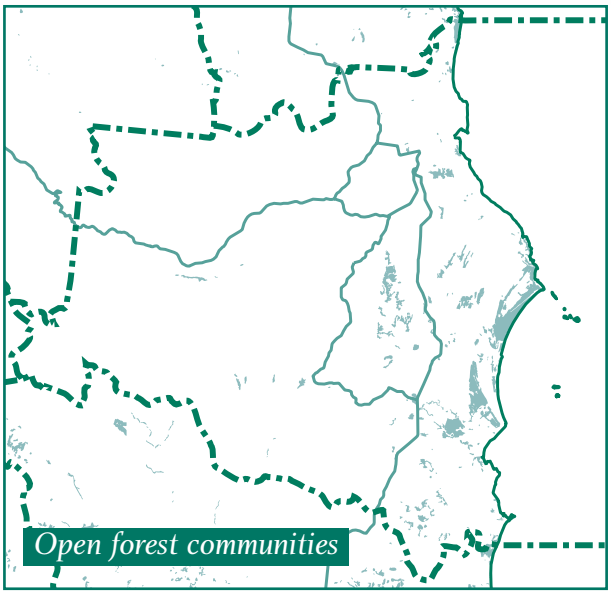
Mangrove communities

With 34 of the world's 69 species of mangroves, the Shire showcases the evolution of mangroves over the past 50 to 60 million years. The estuary of the Johnstone River is a significant fish breeding site, and an important protected habitat.



Open forests

These forests are characterised by their open canopy and plants such as wattles and eucalypts which have hard leaves. Many animals depend on pockets of open forest scattered in and around other forest types. In many places, rainforest plants are encroaching on these areas, and regular fires are needed to maintain these important open forests.



Coastal forests

The Shire's coastal areas are also biologically important, consisting of mixtures of rainforest, paperbark, eucalypt, fan palm and feather palm forests and woodlands, with some containing the rare Native Sugar Palm *(Arenga australasica)*. In places, rainforest is growing on sand. This fragile and rare rainforest community depends on rapidly recycling fallen leaves and nutrients. Once disturbed, these rainforests seldom re-establish and erosion of the shoreline may occur.

Jewels of the Shire

These complex communities of plants and animals are the jewels in the crown of the Shire's natural assets. What binds these jewels together are the farms and properties that surround them. How we manage the surrounding areas will ultimately decide whether these jewels will be inherited by future generations of Shire residents.

The flexible fronds of fan palms have evolved to withstand the force of tropical cyclones.

The Original Landholders

"Us Ma:Mu, we are saltwater and rainforest people"
Victor Maund - Ma:Mu elder

Most of the land in the Johnstone Shire is the traditional land of the Ma:Mu tribal group. Ma:Mu traditional lands extend west to Millaa Millaa, south to Murdering Point near Silkwood, and north through Eubenangee Swamp to Coopers Point. The Djiru, Ngadjon-ji, Yindin-ji, Jirrbal and Girramay tribes occupy lands on the margins of Ma:Mu country. Many local place names are derived from Aboriginal words, like Garradunga, Daradgee, Wangan and Goondi.

The Ma:Mu had well-travelled paths that led to favourite camp sites that were maintained as open areas. Mijas (houses) would be constructed using wait-a-while cane and fronds, and the surrounding area would be home until the group moved on, following the seasonal food sources. Knowledge of the phases of the moon and the seasons were an important part of the way Ma:Mu regulated their hunter-gatherer existence. Ma:Mu seasons are broken up into approximately six periods of two months each. Each season featured a particular group of foods and signs when they were ready to eat.

Ma:Mu women would be responsible for collecting yams, fruits, palm-heart, the new shoots of plants such as tree ferns, and numerous shellfish of the coastline and mangroves. Men hunted a variety of animals including fish, turtles, eels and crabs. All of these resources were used and shared according to customs and strictly adhering to tribal totems. This would prevent overuse and allow stocks to build up over the season.

The wide variety of foods and other resources led to unique adaptations among north Queensland's rainforest people:

- River rafts were constructed from trees bound with wait-a-while cane.
- Shields and swords were carved from the buttress roots of rainforest trees.
- Toxins in bark and leaves were used to stun fish in pools for easy catching.
- Wait-a-while was used for climbing rope, and for making string and baskets.
- Fig bark was pounded and smoked to make blankets.
- Poisonous rainforest seeds were processed into edible food by leaching them in streams for several days.

A large midden (a pile of shells discarded after consuming the flesh of shellfish) exists near Mourilyan Harbour, south of Innisfail. Nearly 30m across and 2m high, carbon dating revealed the midden is over 3,500 years old.

Today, Ma:Mu people and surrounding tribes are re-connecting with their unique culture in modern ways, while still respecting the old ways. Their involvement in bush tucker gardens and tourism ventures shows their interest in sharing and keeping culture alive in ways that are relevant and provide job opportunities for young Ma:Mu people. For their part, younger Ma:Mu are now finding employment as park rangers and guides, participating in the management of their traditional lands under the guidance of their elders.

Ma:Mu students at the Innisfail TAFE are cultivating bush tucker plants for commercial crops.

New arrivals

In 1848, Edmund Kennedy arrived at Hull River (near the southern boundary of the Shire) and travelled through the Palmerston area on his ill-fated expedition to Cape York. Dense mangroves and rainforests blocked his path, eventually dooming his expedition.

In 1872, survivors of the shipwreck "Maria" arrived on the coast near the Johnstone River. Sub-Inspector Robert Johnstone's search party rescued the survivors. In 1873, Johnstone returned to escort the explorer George Elphinstone Dalrymple through the region, and the river was subsequently named after him.

European cedar cutters and Chinese gold seekers began arriving later in the 1870s. In 1879 an Irishman, Thomas Fitzgerald, arrived in the area to take up a 10,000 hectare land grant funded by the Catholic Bishop of Brisbane. With 10 Irish and 35 South Sea Islanders as workers, he began clearing forest and planting sugar cane.

A township developed and was originally called Geraldton until a Russian ship, expected in Geraldton in Western Australia, arrived at the port to collect a load of jarrah wood. A public meeting was held in 1910 and the name of the town was officially changed to Innisfail, the name of Fitzgerald's property.

The region's settlers were culturally diverse. The first influential group were Anglo-Celtic, but they were outnumbered by Aboriginals, South Sea Islanders ("Kanakas"), Torres Strait Islanders, and Chinese miners who developed banana and retail industries.

Photos courtesy of Innisfail and District Historical Society

Edith (above) and Rankin (top) Streets in the 1930s.

Sugar drove the growth of the Shire. The Mourilyan mill was built in 1882 and South Johnstone mill in 1915. Expansion required a large labour force, and as a result, Italian migration began before WW1 and continued until after WW2. There were also waves of migration from Spain, Greece, Malta, Yugoslavia, India, Pakistan and the Philippines. The last big wave of immigrants has been the arrival of Hmong refugees from the border highlands of Laos following the Vietnam War.

For more information:

GENERAL INFORMATION

www.jsc.qld.gov.au
The website of the Johnstone Shire Council profiles the Shire and the Council's activities.

www.walkabout.com.au/fairfax/locations/QLDInnisfail.shtml
The Walkabout Australian Travel Guide site provides local history and a general overview of the district, listing accommodation and tourist attractions.

www.queensland-holidays.com.au/tropical_north_queensland/innisfail.cfm
The Tourism Queensland website has information about Innisfail services and facilities, attractions, events and transport.

www.nrme.qld.gov.au/about/employment/innisfail.html
The Department of Natural Resources, Mines and Energy website provides information regarding Innisfail's history, education facilities, accommodation, community services and activities.

www.gspeak.com.au/Innisfail/index.html
The Innisfail home page offers tourism and regional information, and lists of community groups, services, and local businesses.

www.gspeak.com.au/chamber/
The Innisfail Chamber of Commerce website has a list of members and their contact details.
Ph: (07) 4061 3422 or (07) 4061 3368
PO Box 727, Innisfail 4860

Innisfail and District Historical Society
Ph: (07) 4061 2731
11 Edith St, PO Box 28, Innisfail 4860

Jones, D. (1973), Hurricane Lamps and Blue Umbrellas.
A history of the Shire of Johnstone to 1973. G.K. Bolton Printers, Cairns.

WEATHER

www.bom.gov.au
Flood warnings, river height bulletins and other climate information is available on the Bureau's web page.

Cairns office
(07) 4035 9777

Telephone
Weather 1900 955 360

Flood Warnings 1300 659 219

Weather by Fax

Main directory 1800 630 100

Flood warnings 1902 935 065

River height bulletins 1902 935 057

WORLD HERITAGE INFORMATION

www.jsc.qld.gov.au
The Johnstone Shire Biodiversity Strategy is available on the website.

www.wettropics.gov.au
The Wet Tropics Management Authority website contains general information about World Heritage Area and its unique plants and animals.

www.rainforest-crc.jcu.edu.au
The Rainforest CRC website contains research information, including the effects of global warming in the Wet Tropics.

2. Planning your new home

Whether you're building a new house, shed or driveway, there are many points to consider before you start.

Where do I start?

By careful planning you will ensure your project meets your needs and is suited to the environment. You may also be able to identify and solve problems, which will save time and money in the long term.

Planning controls

Before deciding where to build, you will need to find out what planning controls are in place as they can have a major influence over your design. Check with the Council for easements, setbacks, maximum heights and other building restrictions at: **www.jsc.qld.gov.au.** If your property is within the World Heritage Area, you will need to contact the Wet Tropics Management Authority on ph: **4052 0561** for a permit.

Site analysis

Before you begin your house design, grab a piece of paper and pencil, pull on your walking boots and go for a wander around your block. Start by drawing the general shape of your block and its significant features. You need to consider the following:

- Slope
- Drainage and acid sulfate soils
- Significant vegetation (large trees, weeds)
- Existing roads, buildings and other structures
- Orientation (which way is north) and wind direction
- Cultural sites.

Understanding the lay of your land will help you make informed, practical decisions about options for siting the house that may reduce landscaping and running costs - and improve your lifestyle.

Slope

Mark on your map the varying slopes of your land. When deciding where to locate your house consider the following:

- Lower slopes are generally less steep, easier to build on and less exposed to the weather. Development on lower slopes is also less prominent. However, lower slopes may be subject to lots of water movement from upper slopes and may not have good access to sun. This varies from block to block.
- Steep slopes and upland sites tend to have shallower soils and rocky outcrops, so require more expensive structures. Developments on higher slopes can also have greater environmental and visual impacts.
- Your driveway may also influence your house location, as minimising road works can reduce financial and environmental costs.

Drainage and water

- Walk carefully over your potential house site during heavy rain and look for drainage patterns and potential problems.
- Avoid boggy or poorly drained areas, creeks and gullies, and consider how you will manage drainage during access track construction.
- Locate buildings above the 100-year flood level and design roads and bridges to provide at least partial access during the wet season. (Check with Council.)
- Position buildings well away from key water features to preserve their wild, natural character, and allow you to overlook the feature.
- Position buildings so they don't disrupt existing drainage patterns. This will help to avoid leaks or structural problems and minimise pollution, erosion and sedimentation.
- Do not position buildings in wetlands. Look for Melaleucas (paperbarks) and other plants that grow in boggy conditions.
- Reduce extensive earthworks (such as large cut-and-fill batters) as they will alter the drainage and increase landscaping costs. Opt for framed structures on pole or post foundations, which may cost more to build but will reduce earthwork costs and maintenance.

Replant cut slopes to reduce erosion.

Vegetation

- In 2004, the Queensland Government introduced new laws for clearing vegetation. If you are considering any clearing, immediately contact the Vegetation Management Officer from NRM&E on ph: **4095 7000.** The officer will be able to provide you with detailed advice. Staff at Johnstone Shire Council can provide information about remnant vegetation in your neighbourhood.
- Ideally, place buildings on existing cleared land, or land where you can minimise the number of plants to be removed.
- Identify rare or endangered plant and animal species on the site. Council and QPWS staff may be able to assist with records for your area (ph: **4030 2222** and **4061 5900**).
- Avoid locating buildings next to potentially dangerous trees (eg. brittle, dead branches).
- Shade is an important factor and building locations should be adjusted to retain existing trees where suitable. However, you don't want a building that doesn't get any sun, as it will be cold and mouldy. Ideally find a spot that lets in some winter sun.
- Grab a Weed ID Guide from the Council or the Wet Tropics website: **www.wettropics.gov.au** to establish whether you have any weeds on your land. Weed control sheets are also available from the Council.
- Revegetate disturbed areas with local plant species. Contact the Council's revegetation unit for advice. Plan your garden so that your building will benefit from shade and flower scents.
- Work out where your property boundaries lie and ensure that boundaries and vegetation you wish to retain are clearly marked so that building contractors are aware of them.

Revegetation of cut and fill sites

- Earthworks (cutting and filling) are expensive, have major environmental impacts and create ongoing maintenance. Minimise wherever possible.
- Cut banks present a challenge for revegetation because the sub-surface soil has no organic material and is difficult for roots to penetrate.
- Give yourself plenty of time to stabilise and revegetate earthworks before the wet season.
- Plant small cuts by hand, placing fertiliser in the hole to assist plant growth, then mulch well.
- Larger cuts are best stabilised using hydro mulching – a mechanised process which applies a mixture of glue/organic matter/fertilizer/seed to the surface of the cut.
- Brushmatting involves laying small branches and foliage on the bank to provide nutrients and germination for native seeds. Material can be salvaged from previous clearing or pruning.
- Fill banks (the loose material on the lower side of the cut) are more easily penetrated by plant roots and easily stabilised with local native plants.
- Install silt fences or traps around fill areas to ensure loose soil doesn't wash into nearby creeks.

Views and visibility

- Try to locate and design buildings to take advantage of views without detracting from other people's views and the area's scenic beauty.
- If possible, locate coastal development at least 100m back from the beach and prominent headlands.
- Use external colours that blend into your surroundings (eg. green roof, brown or grey walls).

Locate buildings below ridgelines to minimise visual impact.

Road access

- Form your access track with at least a 75-100mm deep gravel surface that is compacted and shaped to shed water. (Ask your engineer to confirm this when your soil tests are done.) Delivery trucks will also need to use the track during construction, so ensure it's wide enough for safe use by larger vehicles.
- Research has found that maintaining the forest canopy over the road will protect the surface and reduce maintenance costs.
- Ensure the access track does not disrupt natural drainage patterns and follows natural contours wherever possible.
- Form drains at the side of the track to allow water to run off, and keep them clear of vegetation.

Tracks and weeds

Access tracks are usually the first place you will notice new weeds as vehicles carry seeds from other places. Monitor your drive for new weeds and remove them before they seed again and you end up with another invader.

If access is required across steep terrain, cut and fill works will be needed. They can be expensive to install and maintain, and are prone to erosion during heavy rainfall. They should be avoided as much as possible. It's best to get engineering advice before undertaking these works.

- Areas that may be seasonally boggy, or where water flows across the track will need a proper crossing. Either build a concrete crossing or lay box culverts under the track. (Culverts will need to be maintained or they can get blocked with sticks and leaves.)
- Install "whoa boys" on tracks crossing gentle slopes and on long, straight sections. These raised mounds are built at an angle across the track to direct rainwater off the surface and into the downhill side drains before it can cause erosion.
- Revegetate cut and fill areas using locally native trees, shrubs or grasses. This will minimise the risks of erosion and weeds.

Orientation

In the tropics it is also very important to capture breezes, as moving air is the most effective way of cooling people and houses.

- The prevailing breeze for much of the year on the east coast of north Queensland is a south-easterly. However, in the late dry and early wet when it is very hot, we also get a northerly breeze. Try to orient the house to suit these breezes, and locate bedrooms and living rooms with good access to breezes.
- Buildings should also be oriented to minimise sun exposure. This means the longer faces of the building should face north and south where it is easy to shade the high daytime sun, and exposed walls to the west (where the hot afternoon sun comes from) should be minimised.
- Strategic planting of shade trees, particularly on the east and west, can also reduce solar exposure.
- Local conditions such as hills and valleys can affect wind direction. Your neighbours may provide insights to local breeze patterns, or you could put up some flags on your land and monitor what the wind does.
- We tend to get wind-driven rain in the direction of prevailing breezes *(especially the south-east)*, so use verandahs or large eaves to provide some protection on these sides. Consider using windows such as louvres, awnings or casements, which can be left open when it is raining.

Verandahs protect rooms from sunlight and rain.

Geology and soils

Geology has an effect on soil fertility and overall stability of the site. Contact the NRM&E office in Mareeba on ph: **4048 4600** for relevant information.

- Get a soil test.
- Avoid sites with shallow soils especially as they may be prone to erosion (they are often steep sites).
- Plastic or highly reactive soils may cause problems for building footings and slabs.
- Avoid building on soils with high organic content as they may cause subsidence problems.
- Well-drained, sandy loam soils provide the best opportunities for home construction and plant growth.

Cultural heritage

The *Aboriginal Cultural Heritage Act 2003* requires landholders to take all reasonable and practical steps to be aware of and avoid harming Aboriginal cultural heritage. For guidelines ph: **1800 500 037.**

For more information:

Urban Ecology Australia
www.urbanecology.org.au (08) 8212 6760
A non-profit organisation working to promote and create ecologically integrated human settlements.

Cool Communities
www.greenhouse.gov.au/coolcommunities
Cool Communities supports householders to take simple, cost-effective actions that reduce their use of energy and help the environment

3. House design

Now that you have done your homework and know the site's opportunities and constraints, it's time to consider the type of house you'd like to build.

Design and construction

Floods, cyclones, droughts and fire are regular and natural events across the Australian continent. The Johnstone Shire experiences its own seasonal extremes and climate should be a major design consideration. Personal preference will influence your final house design, but regardless of materials used, the best tropical house design maximises the use of space, light, ventilation and insulation.

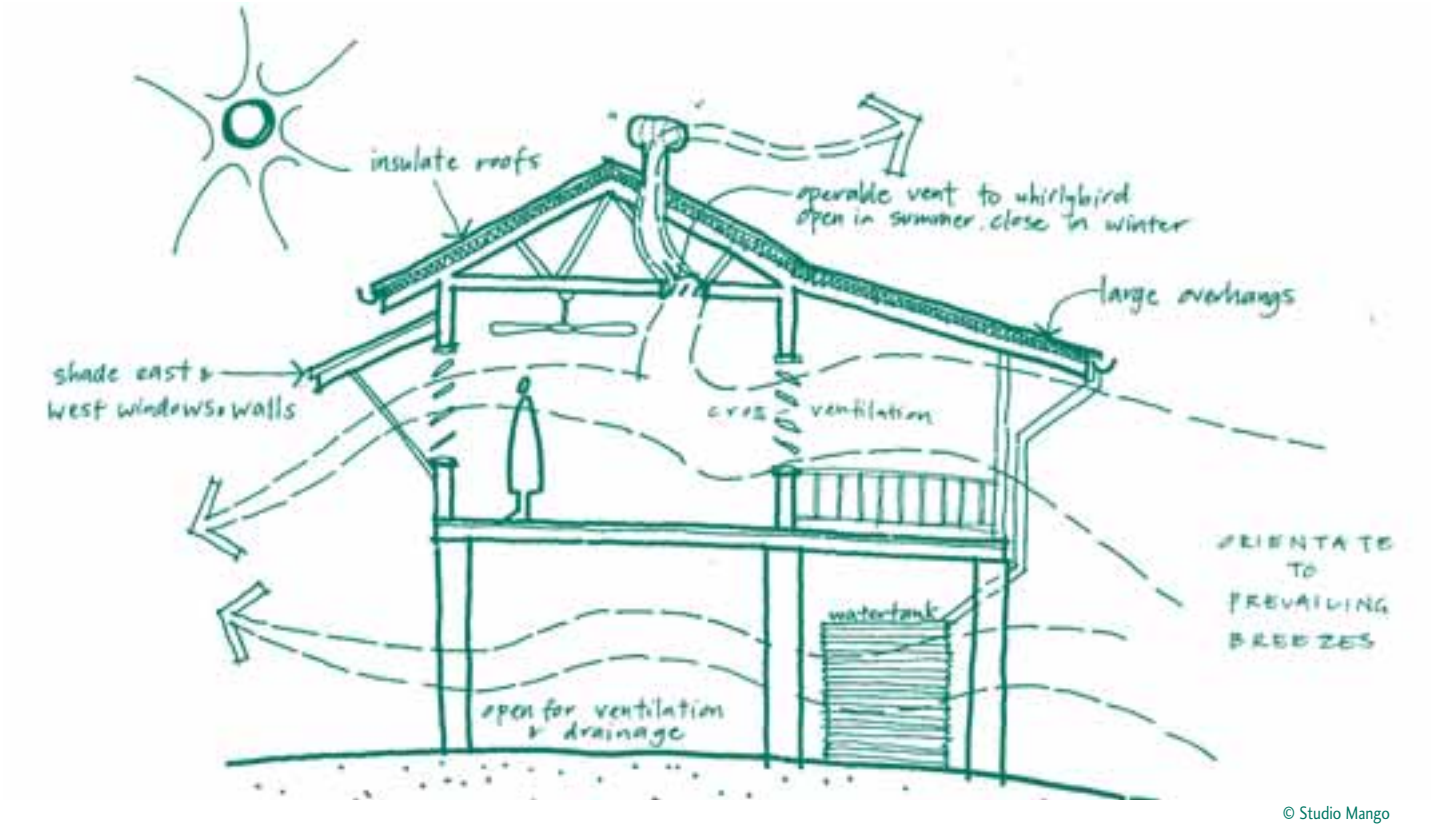
Many people believe that good design always costs more. This is not true. Good design features can reduce building and operating costs through simpler construction, better planning, durable materials and energy-efficient appliances.

The main structural design criteria for house design are:

- Wind classification for the area, to ensure that the building is tied down correctly (eg. in the event of a cyclone)
- Soil classification for the design of the foundations.

The best tropical house designs maximise the use of space, light, ventilation and insulation.

Check out the Australian Government website: **www.yourhome.gov.au** for useful tips about renovating and designing your home. Finding the right people to advise you is probably the most significant step you will take. Contact an Architect or Building Designer to help get your design right.



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Energy efficiency

One-fifth of Australia's greenhouse gas emissions come from domestic energy use. There are lots of common sense actions that households can take to reduce greenhouse gas emissions. Many of these actions make good financial sense and improve aesthetics. The Building Code of Australia sets out the minimum requirement for energy efficiency in houses.

Buildings that are energy efficient in their construction and operation reduce the need to draw upon finite resources such as fossil fuels, and flooding valleys to generate hydroelectric power. Buildings that are energy efficient also save you money, particularly in more remote areas if you plan to generate your own power. It is critical that each building is as efficient and self-sufficient as possible. Use the checklist below to help design your house.

- ❑ Orient the house to catch the prevailing breezes.
- ❑ Provide a large expanse of well-insulated roof.
- ❑ Improve roof ventilation with a whirly bird or ridge vent.
- ❑ Insulate walls if exposed to the sun, particularly the east and west walls.
- ❑ Use light coloured roofs and walls to reflect heat if exposed to the sun.
- ❑ Use a light timber or steel framed structure to store less heat and cool down quicker at night.
- ❑ Shade all windows with generous overhangs, awnings or trees.
- ❑ Have lots of doors and windows; ventilation is the key to a cool house in the tropics.
- ❑ Shelter windows from rain. Awning windows and louvres tend to keep out rain better than sliders, so are good for southern aspects.
- ❑ Replace old light bulbs with efficient compact fluorescent globes or fluoro tubes. The 12 volt halogen lights are less efficient than fluorescent, but still more efficient than regular incandescent bulbs.
- ❑ Make sure there is good natural light.
- ❑ Install a solar hot water system. Government rebates are available.
- ❑ Install a gas stove and throw away the electric kettle and toaster.
- ❑ Buy 4 or 5 star rated appliances, particularly the fridge and washing machine
- ❑ Install ceiling fans.
- ❑ Limit air-conditioning to a few insulated rooms (if at all).

Pole home construction is increasingly common throughout Tropical North Queensland. Steep slopes and high rainfall favour tall, narrow buildings which have minimal ground disturbance and blend with surrounding forest environments. The raised floor gives superior ventilation and drainage.

Managing visitors

Tropical North Queensland has the highest diversity of insects and rodents in Australia. Some of these animals have the potential to make humans ill. Insect screens help to reduce these visitors, however the fine mesh obstructs airflow and can increase fungal growth. You can increase internal airflow by installing fans and keeping your screens clean.

Micro bats are an environmentally friendly way to control insect pests, but can be unwanted house guests. Check out the website: **www.batcall.csu.edu.au** to find out how to exclude bats from your belfry, and how to create an alternative home for them.

Owls love dining on rodents, and their presence alone may deter rats from foriaging freely on your property. Information on how to build or buy owl nesting boxes is available from the Council, **ph: 4030 2222.**

Owls can reduce rodent problems.

Screening your house calls

Rodents and some snakes will try to find ways to raid your pantry, eat pantry raiders or just make your warm, dry house a home. Ensure that verandahs are well sealed from the interior of the house, and keep doors and windows closed at dusk when these animals become active. Rodent-proof insect screens are also available.

Termites

All new building approvals require a termite plan and must comply with the Australian Standard (AS3660.2, 2000).

The most common forms of termite protection are:

- Termite resistant materials
- Physical barriers
- Reticulated pesticide.

Remember if you build a timber house close to the forest it requires constant vigilance to keep termites at bay. Get a pest inspection at least once a year by a qualified pest inspector and ensure you undertake a visual inspection every few months.

Support sustainable timber production

If you're using timber, try to find out where it has come from. A lot of our timber comes from unsustainable clear felling of Asian rainforests. These timbers also do not have natural resistance to termites and other pests in Australia. Ask your builder to use only Australian plantation timbers.

For more information:

Archicentre
www.archicentre.com.au 1300 13 45 13, 07 3846 4970
Archicentre is the home advisory division of the Royal Australian Institute of Architects.

Building Designers Association of Queensland
www.bdaq.com.au 07 3889 9119
The coordinating body for Building Designers in Queensland.

Home Ideas Centre
www.homeideas.com.au 07 3844 9922
Australia's largest network of building and home improvement exhibitions.

Housing Industry Association
www.greensmart.com.au 07 3846 1298
GreenSmart is a program of the Housing Industry Association promoting environmental and affordability considerations.

Master Builders Australia
www.masterbuilders.com.au 07 3404 6444
The Master Builders Association is a national association of Master Builders and represents all sectors of the local housing and construction industry.

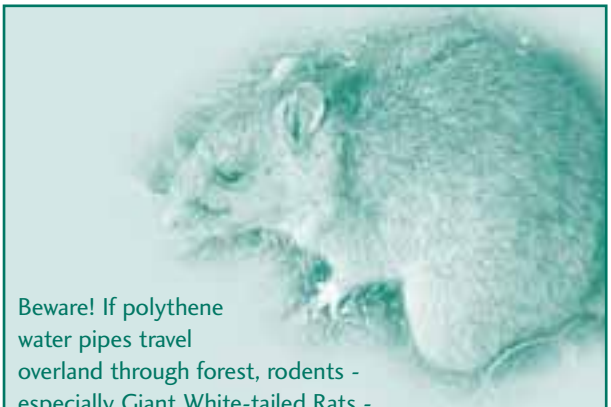
4. Water, waste and power

There are number of options for providing these basic services.

Water supply

If you are not on a reticulated town water supply, then choosing how you collect and store water will be very important. Saving water is also very important to reduce the overall amount of water you need to collect and pump.

- Use water-saving plumbing fixtures and appliances, including an AAA rated shower rose, flow restrictors in your sink and basins, and a front-loading washing machine. Rainwater is generally a reliable source of supply for an average family in the Johnstone Shire. However, during the dry season from May to November water conservation is important, especially if you require water for fire-fighting purposes. Rainwater can be supplemented with a bore or water drawn from a creek or dam on your property and stored in a tank.
- If using rainwater, fit leaf guards to your gutters and keep them maintained. Install a first flush device at the tank to shed the first lot of polluted water from the roof and gutters. Ensure your tank is fully screened to prevent mozzies getting in.
- Bore water is generally of drinking quality, especially in the foothills on the western side of the Shire. The costs of sinking a bore will depend on the depth of the hole. Generally allocate $1,000-$1,500 for the pump.
- Creek water from these areas may also be drinking quality, but upstream activity easily pollutes creeks. If relying on creek water for drinking it is best to treat it. Check with the Council's Health Section for expert advice. (Also, consider the impact of your own activities on downstream neighbours.)
- Water storage tanks always accumulate silt and mud. They need to be flushed every few years to keep the water clean.
- If you have the room, a small dam is an alternative way to store water.
- Whatever system you use, you will need a pressure pump or header tank to supply water from your source to the house. A header tank that is at least 6 metres higher than the house will provide gravity-fed water on demand without constant pumping. It can be filled using solar, electric, diesel or hydraulic-ram pumps. If you can't install a header tank, choose a pressure pump with as large a cell as possible. Ask an expert about a pumping arrangement that will be most appropriate for your needs.
- If you wish to construct a dam or draw water from a stream, you must first consult with the NRM&E office at South Johnstone on ph: **4064 1155,** as permits are required.
- If you plan to use water from a creek, positioning the house below a creek fed tank will give you gravity fed water. If gravity feed can be used, a pump will not be required to pressurise water for use on the property, reducing electricity demand.



Beware! If polythene water pipes travel overland through forest, rodents - especially Giant White-tailed Rats - will chew them. This can be avoided by using pipe 50mm or over in diameter, too wide for the rodent's jaws. Cover joiners in the pipe with rocks, as rodents will find the occasional gnaw on these surfaces impossible to resist. Spraying the pipe with hairspray also deters rodents.

Waste treatment

In rural areas there are no sewage treatment systems and each landholder must deal with their own sewage and grey water on the property. The On–Site Sewerage Code governs state waste disposal standards and any design must comply with this code (see: **www.nrme.qld.gov.au**).

Your waste disposal system must be designed by a suitably qualified person to suit the soil conditions of your site, hence a soil test will be required. Landholders have several options including septic systems, composting toilet and package treatment systems. Installation costs of these systems are comparable but the operation and maintenance requirements vary a lot. You will need to choose a system that best suits your site and your personal requirements. Using water-saving appliances will also reduce the amount of wastewater you have to process.

Septic systems

Septic systems collect sewage and/or grey water in a tank where it is broken down by bacteria that live in water. Solid waste collects and breaks down at the base of the tank, soaps and fats float on the top and the treated waste water (effluent) flows from the tank into an absorption trench where it is further broken down by bacteria that live in the soil. State laws require that the trenches (called the disposal field) must be designed for each site based on soil conditions, so you will need the soils to be tested. Your plumber or designer will then work out how big the field has to be and where to put it.

When planning your septic system, remember these things:

- Get it designed by a suitably qualified person.
- It must comply with the On-Site Sewerage Code.
- The disposal field needs to be mostly level, have well drained soil and get some sun. If your site is in a heavily forested area with clay soils, it could be difficult (and expensive) to build a septic system that will work well; you may need to consider other options.
- You can't drive over the trenches, as this crushes and compacts them and stops them working properly.
- The disposal field is a great place to grow taro, cassava, bananas and other small plants. Big trees are not recommended as they shade the trenches.
- Grey water from the kitchen, shower, laundry and basins can flow directly into the absorption trench but this is not recommended as the soaps and fats will clog the soil. It's better for grey water to go through the septic tank, a separate sullage tank, or even a greasetrap, so the soaps and fats are removed before it gets to the trench. If you will be washing nappies in the house, the laundry water should go to the septic tank.
- Don't put chemicals in the system, and washing powders without phosphorous and fillers are preferable.
- In times of heavy rainfall the disposal field may become soaked and effluent will come to the surface because the soil is saturated. If this happens the area will smell. This can be avoided by carefully choosing the position of the trench, ensuring the soil is well drained, planting it up well and even installing cut-off drains to reduce the flow of ground water into the disposal field.
- Position the absorption trench at least 50m away from a bore or creek and 6 metres from an in-ground swimming pool to avoid contamination.
- Remember to allow truck or trailer access to the tank and trenches so the solids on the bottom can be pumped out every now and then.

Composting toilets

Composting toilets are an excellent option. They reduce the amount of bacteria entering the wastewater stream and save water because they don't need to be flushed. They are good for sites that are subject to flooding or have very poor draining soils. Installation must comply with the Building Code of Australia. Check with the EPA for a list of approved composting toilets.

Compost toilets work like a garden compost system, except they break down human waste. Basically they are a sealed, waterless container where a combination of heat, airflow and bacteria break waste down into compost that can be used to fertilise plants around the property. Urine and liquid produced by the process is drained out of the tanks into a short disposal trench. There are several different brands of composting toilets; they all work slightly differently and are suited to different conditions. You will need to do some research to find the best system for your household and site. Most composting toilets require that the floor is raised about 1 metre above the ground, but one model can be used for slab construction.

The main advantages of composting toilets are:

- Water is not required as there is no flushing.
- No pollutants are produced.
- The compost product is easily handled and can be used around the yard.
- No chemicals are used to clean toilets.
- Vegetable scraps, wood shavings and even paper can be dropped into some of the systems.

Composting toilets use a small fan to dry out the compost. It can be powered with a solar panel, but may require additional power during the wet season or in heavily shaded areas.

If you install a composting toilet you will still need to deal with the grey water from the laundry, kitchen and bathroom. The simplest way to do this is with a sullage tank and trenches. A suitably qualified person will need to design the absorption trench for grey water disposal.

Package treatment systems

There is a range of package treatment systems on the market, also known as Aerated Wastewater Treatment Systems *(AWTS)*. These systems process all household and domestic waste in a multi-chambered 'activated sludge' tank. In the primary tanks, bacteria and aeration processes break down the solids and provide a level of treatment. In the secondary tank, the effluent is chlorinated so that it can be safely used to irrigate gardens. Package treatment systems need to be serviced by a licensed contractor four times a year and must have constant power to operate the pumps and fans. Remember that if the power goes off, no treatment happens, so if your power supply is unreliable this may not be the best option for you.

Collecting and storing water and solar energy are becoming cost-effective, common options for home owners.

Electricity

When it is available, most landholders choose to use 240-volt mains power because it is cheap and easy to manage. If you can't access mains power, the main alternatives are systems powered by diesel or petrol generators, or the renewable energy sources of sun and water.

It is recommended that one or more of these options be used in combination with a bank of deep cycle batteries. This is called a 'hybrid' system. Surplus power produced by generating systems is stored in the batteries and can then be used when power is not being generated. Batteries are essential when using a renewable source of power such as solar, to store the power as it is created during the day for use at night. Batteries are also a good option with generators because you can run the generator for fewer hours. This saves money and maintenance.

When using your own power generation system, it is important to manage the loads of your appliances. This means making sure that you draw the most power when it is being generated, not when running off batteries. You may need to fit a timer to your fridge, freezer and hot water system to do this. Reducing the amount of work your batteries do will extend their life.

Petrol or diesel generator

Generators are probably the most common source of independent power. They are relatively cheap to buy, easy to maintain and can provide power on demand. On the downside they are noisy and expensive to run. If possible use a small generator with batteries, or as a back-up to a solar or hydro system.

Solar array

If you have a sunny site, a solar array is an excellent option for generating power. Although the panels are expensive to purchase, there are some government rebates available and once they are installed they will produce power whenever the sun shines. The power that is produced by a solar array is 12V. You can connect it directly to 12V lights and appliances in your house, or run it through an inverter that converts it to 240V power. For a stand-alone solar system you will need a battery bank, and a back-up generator is recommended for those cloudy days.

If you are connected to the mains power grid, you can still install solar panels on your house. During the day you make your own power, even export some to the grid, and at night you take power from the grid.

You will need to get expert help to design a solar system that meets your needs.

Micro-hydro

Hydro systems harness the energy in moving water to generate power. If you have a creek or waterfall on your property that runs all year, micro-hydro is an excellent *(and cheap)* option. There are several micro-hydro systems available on the market, or you can build your own. To install a micro-hydro system you may need a permit from NRM&E.

Although not essential, a small battery bank and back-up generator to meet peak load demands are recommended.

Kitchen scraps

You should also consider how you deal with kitchen waste. Throwing out the scraps or putting them in an uncovered compost heap may attract unwanted visitors such as Cassowaries, rodents and feral pigs. Use a covered compost bin or keep chickens and turn kitchen waste into a usable product.

Sustainable Industry

Paul Verity and Susan Kelly – Sanctuary Retreat, Mission Beach.

Paul and Susan purchased 18.5 hectares of rainforest in 1996. Their property is located in a critical cassowary habitat corridor where a well-known population of the birds move through fragments in the Garners Beach area.

Because the property had such high conservation value, Paul and Susan made an early decision to protect the maximum amount of available habitat, and sought "Nature Refuge" status for the forest surrounding their planned resort. This commits all future owners to its permanent protection.

The couple planned their resort concept in consultation with the Johnstone Shire Council and the local environmental group C4. Cabins were built using minimal impact pole construction on an old logging track running along the ridge. Buildings are designed for cross-flow ventilation, so air conditioning is not needed. Glass and light colours provide natural light, reducing electricity demands.

The resort's mini-sewage plant treats all waste on site. The treated water is recycled through the toilet system, and the excess irrigates 9ha of rainforest.

Cassowaries pass through the resort daily, which is a major attraction for guests, so cassowary conservation is an important part of the resort's sustainable approach. Interaction between guests and the birds is discouraged. The resort is now enjoying the fourth generation of birds on the property, showing that sensitive development and conservation can be mutually beneficial.

For more information:

Alternative Technology Association
www.ata.org.au (03) 9419 2440
A non-profit community group that aims to use and promote environmentally friendly technology.

Australian & NZ Solar Energy Association
www.anzses.org (02) 9402 1638
ANZSES exists to promote scientific, social and economic development through the environmentally sound utilisation of solar energy.

Energy Rating Home Page:
www.energyrating.gov.au
A website that includes energy ratings on all common types and brands of appliances.

Queensland Conservation Council
(07) 3221 0188

Environmental Protection Agency
www.epa.qld.gov.au (1300) 369 388

Australian Greenhouse Office
www.greenhouse.gov.au (1300) 130 606

Department of the Environment and Heritage
www.deh.gov.au (02) 6274 1111

Department of Industry, Tourism and Resources
www.industry.gov.au (02) 6213 6000

Department of Transport and Regional Services, National Office of Local Government
www.nolg.gov.au (1800) 065 113

5. Environmental guidelines and assistance

Find out about the latest regulations and resources to help you with land management decisions.

Johnstone Shire Plan

The Johnstone Shire Plan provides the framework for managing growth in the Shire over the next 10 to 15 years. The Plan regulates development including where land uses can occur in the Shire and what conditions may be required, and what size allotments can be created through subdivisions. The Plan also shows how to protect cultural heritage, natural environments and visual amenity, while protecting life and property from hazards. The Plan can be downloaded free from the Council website at **www.jsc.qld.gov.au** or purchased for $50 on CD, or $300 for a printed copy with maps, ph: **4030 2264.**

Living with World Heritage

About ten freehold blocks in the Johnstone Shire are part of the World Heritage Area. The Wet Tropics Management Plan regulates activities that may damage the vegetation, soil or water on these blocks. This includes clearing vegetation, constructing buildings and roads, building weirs and quarrying. World Heritage landholders will need to apply for a permit from the Authority to undertake these types of activities, ph: **4052 0561**.

Many landowners in the Shire are World Heritage neighbours. Check whether you are a neighbour by contacting the Wet Tropics Management Authority with your property details. Staff will provide you with a map showing the World Heritage boundary in relation to your block. If you have a common boundary, the Council may refer development or rezoning proposals to the Authority to ensure the proposals won't damage the World Heritage Area. The Authority has a "Good Neighbour" policy to work with landholders to achieve mutually beneficial outcomes on land management. Staff can provide advice on fencing, fires, feral animals and weeds.

The Authority has set up community advisory groups to act as a conduit for community concerns and advise the Authority's Board on policy issues. Contact the Authority on ph: **4052 0561** to find out how to contact your local community representative.

Vegetation clearing

In April 2004, the Queensland Government introduced new laws for clearing vegetation. If you are considering any clearing, immediately contact the NRM&E Vegetation Management Officer on ph: **4095 7000.** The officer will be able to provide you with detailed advice on the new laws including regrowth, rural residential blocks, exemptions and financial assistance. Council staff can provide information about remnant vegetation in your neighbourhood.

Many residents are World Heritage Neighbours.

Advice and assistance

Wouldn't it be great to have a botanist, weed expert, or a planning consultant come to your property to give you firsthand advice about land management? Unfortunately, many government agencies no longer offer one-on-one extension services where experts will visit your property and give free advice.

To make land management issues more confusing, changes in government legislation and policies have placed greater responsibilities on local councils and community groups. The result has been a lot of grey areas and confusion about which agency is responsible for what issue. If you are seeking expert help or financial assistance, take a comfortable seat beside the telephone with a pad and pencil in hand, and try the following steps:

- Contact the Council on ph: **4030 2222.** Officers will be able to help on issues such as weeds, feral animals and revegetation.
- Contact the NRM&E office at South Johnstone on ph: **4064 1155.** Although staff may be unable to make property visits, they have a wealth of knowledge on issues such as declared pest plants and feral animals. For "in-crop" weed and pest situations the best contact is DPI&F or the relevant industry body (e.g. Innisfail BSES Extension Centre).

- Seek out free advice from the local network of community conservation and industry groups. These groups are often recipients of government grants for revegetation projects, property planning and extension services. Start with the Johnstone Catchment Coordinator, ph: **4061 6477** or email **jrmca@znet.net.au**. Another good option is the Johnstone Region Landcare, phone Peter Rowles **4061 1602** after hours.
- For a fee, private consultants will provide detailed property plans and advisory services.

C4 volunteers such as the late Bruce Beavis (above) and his wife Dot have raised thousands of rainforest seedlings for local landholders. If you would like plants, or to volunteer at the C4 nursery, ph: **4068 7197**.

Conservation covenants

Conservation covenants are voluntary agreements between landholders and a government body such as the Johnstone Shire Council or the Environmental Protection Agency. Covenants are designed to protect the environment on private lands. Agreements are negotiated between landholders and government and terms and conditions vary. The covenant can be placed on the property title so that the area is permanently protected, binding current and future owners. Covenants do not necessarily stop development, but rather ensure that the development is consistent with protecting the property's natural values. Landholders taking part in these schemes may be provided with a number of benefits and services including:

- information on native animals and plants
- assistance with materials and labour for weed control and revegetation
- assistance with the preparation of a management plan
- possible tax benefits.

One of the best schemes is provided by the Council, which offers a discount on rates for any percentage of eligible land that the landholder enters into the covenant. "Rate Deferral" varies from 60 per cent for critical habitat, to 20 per cent for land that has been recently re-planted. The Council also provides "Bonus Development Rights". These rights permit more intensive use over part of the land in exchange for placing the remainder under protection. They may allow subdivision, reconfiguration and more intensive development.

Tax deductions and special treatment of capital gains tax may also be available to landholders entering into conservation covenants.

For more information:

VEGETATION MANAGEMENT

NRM&E Vegetation Management Officer
ph: (07) 4095 7000.
www.nrme.qld.gov.au/vegetation (for vegetation management information and property planning fact sheets)

NRM Board and Johnstone Catchment Coordinator
Rankin St, Innisfail. ph: (07) 4061 6477
www.nrmboard.org.au

Wet Tropics Management Authority
For World Heritage information and property maps
1/15 Lake St, PO Box 2050, Cairns 4870
Ph: (07) 4052 0561 Fax: (07) 4031 1364
www.wettropics.gov.au

Johnstone Region Landcare
ph: (07) 4061 1602 (a/h)

Johnstone Shire Community Revegetation Unit
ph: (07) 4030 2287
Warrina Lakes Park, Campbell St, Innisfail 4860

Johnstone Shire River Improvement Trust has developed detailed action plans for Liverpool Creek and the South Johnstone River and anticipates completing a similar plan for the North Johnstone River. The Trust has also completed a Flood Study for the lower Johnstone River. To view the action plans contact the Johnstone Catchment Management Association on (07) 4061 6477. For information regarding the Flood Study contact the Council on (07) 4030 2222.

CONSERVATION COVENANTS

Commonwealth Department of Environment and Heritage
ph: 1800 803 722, (02) 6274 2368 fax (02) 6274 1858.
www.deh.gov.au/biodiversity

Australian Taxation Office
www.ato.gov.au

Johnstone Shire Council
ph: (07) 4030 2222.

Environmental Protection Agency
ph: (07) 4091 1844
www.epa.qld.gov.au

6. Agriculture and nature conservation

Whether you have a small lifestyle block or you're running a large farm, good land management is a sound investment for the future.

Sugar cane has been grown in Johnstone Shire since 1879.

Agriculture and nature conservation can mix successfully with any production system, as there are many mutual benefits. By strategically using native vegetation, a number of significant farm problems such as weeds, pest animals, soil erosion and wind damage can be greatly reduced. Many farmers in the Shire are overcoming these problems with innovative, environmentally sustainable solutions.

Sugar cane

Soil erosion, feral animals, weeds and acid sulfate soils are big issues for the cane industry. Stream banks, drains and other non-cropping areas are nursery areas for weeds to grow and spread into adjacent cultivation. They also harbour pest populations of two native rodents, the Canefield Rat and Burton's Climbing Rat. These animals can cause many millions of dollars in damage to Queensland's cane industry each year. Research has shown that by replanting weed-infested stream banks, damage from rats can be reduced to virtually nil. Revegetation results in less weeds, less herbicide, fewer pests and more time for other farm jobs. For further information about the research, contact the BSES Extension Centre in Innisfail on ph: **4061 1707.** The former statutory authority is now an industry-owned provider of research, development and extension services.

Erosion can also be managed by retaining vegetation or replanting local rainforest trees along stream banks. The Shire's Revegetation Unit on ph: **4030 2287** operates a community nursery where cane farmers can receive technical advice about stream bank revegetation. The Johnstone Area Landcare group on ph: **4061 1602** (a/h) has also developed extensive expertise. A plant list on pages 38-39 contains species generally recommended for revegetation. For more specific information on your particular situation, visit the Council's Technical Officer on Thursday mornings at the Council Revegetation Unit located in the Warrina Lakes Park and accessed from Campbell St, Innisfail.

Fish breeding lagoons

Coastal cane farms often have low lying, waterlogged areas which only produce a good crop in very dry years. Officers from the Department of Primary Industries and Fisheries *(DPI&F)* have been working with farmers to increase the productivity of these areas for both sugar and fish. After testing to exclude acid sulfate areas, lagoons are excavated to approximately 3m deep and from 0.1ha to over 1.5ha in surface area. Spoil is used to build up adjacent waterlogged areas, allowing cane production in all years. Cane drains are fed through these lagoons rather than emptying directly into creeks. Lagoons quickly fill with fish, prawns, turtles, crocodiles and other wildlife. As with other wetlands, these constructed lagoons reduce the nutrient and sediment loads in runoff that may otherwise end up on the reef. Aquaculture requires approvals from Council and state agencies *(DPI&F and EPA)*, so discuss your plans with these agencies before you commence.

Fish breeding lagoon under construction.

Acid sulfate soils

Lagoons are not suitable on acid sulfate soils, which are a potentially serious problem on the Shire's coastal lowlands. Soil testing is recommended (and could be required under State Planning Policy 2/02). If you are planning to put in drains, dams, roads and other earthworks in areas below 20m in elevation, an acid sulfate soil investigation may be needed (check with Council ph: **4030 2222**). Guidelines for sampling, analysis and management are available on the NRM&E web site. You will normally need professional assistance with identification, sampling and interpretation of results. Local laboratories charge about $100 per test, but this is a small amount compared to the cost of rectifying acid sulfate problems which could range from tens of thousands to millions of dollars.

Regional Agforce president Norm Kippin offered this advice to new graziers in the Johnstone Shire: "Well this country's very different... with the wet season, you've really got to manage your pasture or cattle will cut up the soil... and you've really got to watch the weeds, they're a big problem."

Agforce has identified the following issues which need to be addressed to increase grazing sustainability in the region:

- Properly resourced tropical beef extension officers to provide advice on issues such as managing pasture (especially risks from over-grazing) and appropriate use of fertilisers and chemicals.
- An advisory service for part-time and new owners on ways to minimise sediment loss, reduce the introduction of weeds and improve weed control.
- Coordinated weed management and control including machinery and stock crate movements.
- A reduction in pest animals and weeds in the World Heritage Area and national parks.
- Guidelines for managing cattle and weeds around water courses.
- The use of off-stream watering points to reduce the impact of cattle on waterways where fencing is impractical due to flooding.
- More information on the various types of vegetation growing along waterways.
- Further research into the impact on water quality of cattle watering on streams.
- Introduction of sustainable pasture species to improve sediment control.

Grazing

The Shire's high rainfall and fertile soils make sediment control and weed control high priorities for beef producers. Many grazing areas are low-lying, adjacent to rivers and wetlands. These areas, along with forest fragments on grazing properties, require sensitive management.

Tropical foods & other industries

With low world prices and market deregulation, cane and banana farmers are facing challenging times and many farmers are seeking to diversify into new products and value-add to their existing produce. They include banana fibre, tropical fruit wines, bush tucker, ornamental horticulture such as native foliage, Asian vegetables, herbs and spices.

The Cairns Regional Economic Development Corporation *(CREDC)* on ph: **4051 2166** has developed industry "cluster groups" to collaborate on developing and marketing a range of industries including tropical foods, cut flowers and bio-industry.

Farm forestry

Tropical cabinet timbers are gaining popularity as a viable, sustainable land use. While the trees are maturing, there are potential spin-offs including carbon credits, tax incentives and environmental benefits (eg. trees provide shelter for livestock, which improves production). A number of government and private organisations are available to provide advice and support.

Agroforestry

Agroforestry is not widely practiced in Queensland, but is common in the tropics outside Australia. Agroforestry is the integration of trees into the farming system in ways that lead to considerable environmental benefits, specifically to ecological function - the ways in which food chains, life cycles, nutrient cycles and hydrological cycles operate. It involves diversifying agricultural systems with a wide range of tree species for timber and non-timber forest products *(such as fruits, nuts, foliage, cut flowers, medicines, fibres, oils, latex, resins, etc.)*. The result is an agro-ecological succession which mirrors the kind of succession we see in natural habitats, from early pioneer species to late succession or climax species.

The trick for the farmer is how to do this in a way that enhances the profitability of the farming system. In simple terms this is achieved by growing trees that will also produce a suite of marketable products throughout the rotation. Usually a quality hardwood timber is the end-product of the rotation. In Queensland the emergence of the 'bush tucker' industry may offer opportunities for the expansion of agroforestry and the enhanced sustainability of land use that agroforestry offers.

Harnessing nature

Barn Owls are a farmer's best friend. They hunt at night over paddocks and fields, and their diet is almost 100% rodents. It is estimated that a breeding pair of Barn Owls will consume more than 2,000 Cane Rats per year. Barn Owls are not as territorial as most other owl species and so several pairs can hunt and breed around the paddocks of a single farm provided that windbreaks of trees remain. A case study on a farm in Tolga showed that while the consumption of rats by Barn Owls is high enough to have some impact on rodent populations, the presence of the owls also makes the rats more cautious, meaning that they stay closer to cover and don't cause as much damage to crops.

Information about building or buying owl nesting boxes is available from the Council on ph: **4030 2222.**

An effective way to learn more about revegetation and land management is to join a community volunteer group. They can give you hands-on experience, a chance to form friendships, and a way to contribute to the local environment. Above: Council staff at the community nursery assist with plants and technical advice.

For more information:

Wet Tropics Management Authority
ph: (07) 4052 0561
A permit may be required for agricultural activities within the World Heritage Area.

Canegrowers
ph: (07) 4061 1133 fax: (07) 40614577
88 Rankin St, Innisfail 4860

BSES Innisfail Extension Centre
www.bses.org.au
ph: (07) 4061 1707 fax: (07) 4061 4414
Goondi Mill Road, PO Box 630, Innisfail 4860

Agforce
ph: (07) 4068 6090 or (07) 4068 1302

Queensland Farmers Federation
www.qff.org.au
for Environmental Code of Practice for Agriculture

Horticulture Australia
www.horticulture.com.au

Rural Industries Research & Development Corporation
www.ridc.gov.au

Australian Banana Growers Council
www.abgc.org.au ph: (07) 3213 2405

Department of Agriculture, Fisheries & Forestry
www.affa.gov.au

JCU Agroforestry and Novel Crops Unit and
Network for Sustainable and Diversified Agriculture
ph: (07) 4042 1573
Email: Roger.leakey@jcu.edu.au

Native Foods Association of FNQ Inc.
ph: (07) 4096 8257 or (0429) 121212
www.australiantropicalfoods.com
PO Box 150 Malanda 4870

Tropical North Queensland TAFE (Innisfail campus) offers flexible courses and workshops in Horticulture, Conservation and Land Management, Chemical Certification and ACDC (Agricultural Chemical Distribution Control Act Commercial Operators Licence). ph: (07) 4043 8622

CREDC
(for Tropical Foods, Cut Flowers and Bio-industry clusters)
Ph: (07) 4051 2166
www.credc.com.au/clusters.html

Private Forestry North Queensland
An industry cluster of growers, millers, investors, universities, reforestation companies and government.
ph: (0418) 760 139
Email: david.skelton@pfnq.com.au www.pfnq.com.au

Queensland Forestry Research Institute
Useful information on commercial timbers.
ph: (07) 4092 9904
Email: geoff.dickinson@dpi.qld.gov.au
www.dpi.qld.gov.au/hardwoodsqld/

DPI&F
www.dpi.qld.gov.au
fish breeding lagoons ph: (07) 4092 9921 or
alf.hogan@dpi.qld.gov.au

Queensland Acid Sulfate Soils Investigation Team
ph: (07) 3896 9819
www.nrme.qld.gov.au/land/ass

7. A quick ecology lesson

A quick ecology lesson helps to explain ecosystem processes and how to make them work for you and your property.

Fragmentation

Fragmentation occurs when large tracts of continuous forest are broken into smaller patches and separated by agricultural or urban developments. North Queensland has an estimated 10,000 forest fragments. Forest fragmentation has two main effects:

- Fragments become isolated from each other.
- They are exposed to 'edge effects'.

Isolation

Isolation plays havoc with the important ecological process of dispersal. Dispersal occurs in all ecosystems at all times. It includes flying foxes depositing pollen on flowers which are kilometres apart, and genes being passed from one territory to another during the Cassowary mating season. Dispersal also includes young animals being ejected from their parents' territory to find their own home range. When forest is cleared, or fragmented by roads and powerlines, dispersal patterns and processes can be disrupted.

All species have specific habitat requirements. For instance, some possums need tree hollows. If their patch of forest has no nest hollows then these possums cannot survive there. Even if there are a few nest hollows, the patch can still only support a limited number of animals, and sooner or later young dispersing animals will encounter the edge of the patch. When rainforest species come to the edge of the patch, they go no further. Inevitably the effects of in-breeding take their toll, and species extinctions begin to occur in the patch.

While some species die out and are not replaced, others in the patch thrive because there is less competition for resources and their predators are no longer present. Large predators such as amethystine pythons and powerful owls require large areas and can't exist in small fragments. Prey such as seed-eating rodents increase, so the number of seeds that germinate and grow are reduced. Cassowaries can no longer visit the patch, so the seeds of many tree species won't be dispersed there. The isolated patch gradually loses species. The result is a greatly simplified system that bears little resemblance to the diverse, luxuriant forests that once existed.

Reconnecting the fragments

One way to overcome the problem of isolation is to connect fragments with 'corridors' of native vegetation, but this is not as easy as it sounds. Land between fragments of forest is usually privately owned, so re-establishing habitat connections requires neighbourly cooperation. Once the landholders agree to take part, establishing habitat connections is relatively straightforward. The Council's Revegetation Unit and community groups are ready and able to assist landholders to re-establish habitat connections through their properties.

One of the easiest ways to reconnect forest fragments and create a network of wildlife corridors is to use gullies and creeks. Restoring forest along stream banks has other advantages including improving fish habitat and water quality, reducing soil erosion and removing weeds. If a watercourse runs through your property and the banks are infested with weeds, replanting the banks with native vegetation may be your highest priority.

The loss of lowland plains

Across the world, tropical lowland plains are the most heavily fragmented. Around 80 per cent of lowland tropical rainforests between Cooktown and Ingham have been cleared since colonisation.

Corridors at work

Researchers on the Atherton Tablelands studied the way animals and plants used a 1.2km corridor replanted near Lake Barrine. Within three years, almost a complete suite of forest birds were using the corridor and 50 new species of plants had germinated. Many small mammals had colonised the corridor and genetic studies conclusively showed animals were moving from one patch to another through the corridor.

Edge effects

Landholders in the Johnstone Shire who share a boundary with a patch of native forest are in some way managing an 'edge'. Understanding the nature of these edges is important in order to solve the problems they cause:

- Because sunlight penetrates further into the forest at the edge, temperatures rise and humidity and soil moisture decrease. Studies have detected relative humidity changes up to 100m into the forest. Beetles and butterflies that normally occur in more open areas have been found 250m into the forest.
- Wind penetrates further and more strongly into the forest, further reducing humidity and soil moisture.
- Increased light, heat and wind turbulence favours other groups of plants that are better adapted to drier, less protected soils - such as weeds.
- Large trees close to the edge are often unable to cope with these microclimate changes and die, moving the edge - and the weeds and light-loving plants - further into the forest.
- Where natural areas have an edge with towns or house yards, invasion by shade-loving garden plants and domestic pets is another damaging edge effect.

Forest edges create a unique environment which requires careful management.

Most rainforest plants and animals avoid edges. However, certain native edge specialists may thrive at the expense of other species. Edges may also attract birds and animals that normally avoid this zone when flowers, fruits and insects are available at times when resources in the forest interior are less abundant. Some rainforest animals such as the Giant White-tailed Rat and the Brown Tree Snake thrive in the tangles of vines and fallen timber on edges, consuming many bird eggs and nestlings along the way.

Living on the edge

Marcus and Tiffanie Bulstrode have 600m of World Heritage edge on their 13.5 ha property at Mena Creek. When they first moved onto the block in 2000, much of it was a wasteland of weeds. The couple mainly used their small slasher/tractor to tidy up the property. "We had a forest of weeds, but we've only ever used ten litres of Roundup," Marcus says. "We just mowed out the guinea grass and the sicklepod." The low growing grass that replaced the weeds is easily controlled as the couple gradually replant areas with rainforest trees. The property is now a haven for a large colony of Agile Wallabies.

Marcus and Tiffanie are part of a growing number of World Heritage neighbours who are interested in improving the management of their piece of edge, and conserving the special animals which share the area. Sometimes minor changes have a big effect. Marcus has discovered that by replacing the top strand of a barbed wire fence with plain wire, eastern tube-nosed bats are spared the agony of death by barbed wire.

Marcus says: "Living on the edge – that to me is a critical part of it – it's not just about weeds and pigs. Those of us who live on the edge... well, we have a significant responsibility and a big role to play."

Fire

Fire is an essential part of the life cycle of the Shire's swamps and woodlands. These areas would have been burnt by indigenous people during their seasonal walks through tribal territory. But if fires are too frequent and intense, they can destroy these forests, with catastrophic effects on wildlife. Rainforest plants can't tolerate fire at all. Edges scorched by fire can be quickly colonised by grass and weeds, making the edge more fire-prone than ever. Uncontrolled fires also threaten homes and crops.

If the vegetation on your property is not rainforest and you want to introduce a regular fire regime, contact the Authority for assistance to identify your private and government neighbours. Contact the Rural Fire Service in Innisfail on ph: **4061 8915** to find out your local fire warden, for advice and a permit if you are planning to light a fire greater than two metres across. For a Property Fire Management Planning Kit go to: **www.gu.edu.au/school/asc/fire2/kit.** Fire is a very powerful ecological tool, and a conservative approach is strongly recommended.

Vine invasions

Many areas of rainforest in the Shire have been subjected to widespread damage from cyclones and logging. The resulting disturbance has encouraged vine invasions which smother trees. Some of these vines are introduced weeds, but one of the common vines is a native, the Captain Cook Vine *Merremia peltata*. Repetitive cutting of vines in a small area of damaged forest near Josephine Falls has shown the forest can respond quickly and close its canopy. However, this approach is too labour-intensive for large areas of forest.

Disturbance

Disturbance is a continuous and essential part of healthy ecosystems. In order for new plants to germinate and grow, others must die and decompose. Plants called "pioneers" have evolved to suit disturbed areas. With a "live fast, die young" attitude to life, this group quickly colonises areas that have been disturbed by cyclones, floods or human clearing. They grow rapidly and produce large crops of small flowers and fruits from an early age. Disturbed areas are common on the forest edges, so it is no surprise that edges are colonised by pioneers. Their rapid growth soon creates a shaded environment. Longer-lived rainforest plants prefer these shady conditions, and slowly replace the pioneers.

Succession

The replacement of one group of plants by another is called succession. Because disturbance is a continuous process, succession follows the same pattern. However, weeds halt succession because most native plants can't compete with the more aggressive foreign invaders. If weeds are controlled along the edge, native seeds and seedlings which are surviving under the weeds get a chance to grow, and the normal process of succession and recovery takes over. Rainforest plants once again begin to dominate, the edge starts to seal itself and the forest begins to move outwards. Planting native trees or timber plots along the edge casts shade which most weeds can't tolerate. This is a long-term strategy and involves controlling only the weeds that might compete with the plants you establish.

Ecotones – natural edges

Natural edges are created when two different types of habitat merge together, for instance rainforest and open eucalyptus forest, or melaleuca wetlands and mangroves. These zones are called 'ecotones' and often contain plants and animals that occur only in these transitional areas.

For more information:

Queensland Herbarium
offers a free plant identification service for private landholders. Contact them about how to collect or photograph a specimen.
ph: (07) 3896 9326 fax: (07) 3896 9624
Email: Queensland.Herbarium@epa.qld.gov.au
www.epa.qld.gov.au

Johnstone River Catchment Management Association
Ph: (07) 4061 6477 Email: jrmca@znet.net.au
Johnstone Catchment Centre, Rankin St, Innisfail 4860

Johnstone Shire Community Revegetation Nursery
From 8 am to 12 noon, volunteers help Council staff pot seedlings every Thursday morning followed by morning tea. Newcomers welcome! Ph: (07) 4030 2287
Warrina Lakes Park, Campbell St, Innisfail 4860

Society for Growing Australian Plants
www.sgapqld.org.au

Johnstone Region Landcare
Ph: (07) 4061 1602 (a/h).

TREAT
is an active and experienced community revegetation group on the Tablelands. ph: (07) 4095 3406

Johnstone Ecological Society is a long-standing, active conservation group that is involved in conservation and natural resource/sustainability issues. Monthly meetings and field trips.
Ph/fax John Ridd on (07) 4061 1154.
PO Box 1917, Innisfail 4860.

C4 (Community for Coastal and Cassowary Conservation)
ph: (07) 4068 7197
PO Box 165, Mission Beach 4852.

Innisfail TAFE
The horticulture students' plant nursery is open for public information and advice on Friday mornings (8 am to 12 noon).
ph: (07) 4043 8622

Rural Fire Service
ph: (07) 4061 8915

Queensland Parks and Wildlife Service
QPWS has detailed prescriptions for fire management of specific vegetation types and may be able to assist with advice.
ph: (07) 4061 5900

8. What to do about weeds

One of the biggest problems for new land owners is how to recognise and control weeds.

Weeds

Plants become weeds when they are introduced to an area outside their normal range and then spread because their natural predators and other checks and balances are not present. Many weeds have been introduced into Australia since colonisation and exotic plants now make up about 10 per cent of Australia's flora. Many were introduced deliberately as garden plants or for agriculture.

Be alert

Learn your local weeds by getting the Wet Tropics Weed ID Guide from the Council, or the Wet Tropics Management Authority website: **www.wettropics.gov.au.** Keep a copy in the glove box of your car as you drive around and be on the lookout for any new plants, especially along roadsides, disturbed areas and places where vehicles, people or animals may spread seeds. If you notice an unusual plant, act quickly! Mark the location. Take a photo if you can. Get it identified.

Identifying weeds

First, try identifying the weed yourself using the Weed ID Guide or the Weed Fact Sheets on the NRM&E website. If you have no luck, take a photograph or collect a sample to show an expert. You will need a good-sized branch with leaves, fruit and flowers intact, if possible. Write down the exact location where you found the plant and any other relevant information. *(eg. Is it a vine, shrub or tree? How tall? Any conspicuous features? Was it growing on a creek edge or in a paddock?)* Place the specimen in a sealed plastic or paper bag and take it to the Council's Pest Management Officer or the NRM&E office at South Johnstone.

Weed priorities

Once you have identified the weeds on your property, you will need to prioritise how to control them. Some of the decisions are already made for you. The Queensland Government's *Land Protection (Pest and Stock Route Management) Act 2002* imposes legal responsibilities on landholders to control serious weeds, see the website: **www.nrme.qld.gov.au/pests/legislation.** The Council also requires landholders to manage weeds under the Shire's Pest Management Plan. These "declared" weeds have been divided into three separate categories:

A Siam weed infestation at Mission Beach. This is a Class 1 pest which must be eradicated.

- **Class 1** pests are not common in Queensland and must be eradicated if they appear. These are the real nasties for you to watch out for.

- **Class 2** pest plants are established in Queensland and landholders (including government agencies) have a legal responsibility to keep their land free of these weeds. They are the subject of ongoing, coordinated efforts by the local council, community groups and landholders.

- **Class 3** pests are mostly environmental weeds and vigilance is recommended, especially near environmentally significant areas.

Johnstone Shire's declared weeds

Class	*Common Name*	*Botanical Name*
1	Siam weed	*Chromolaena odorata*
1	Thunbergia	*Thunbergia annua, T. fragrans & T. laurifolia*
2	Giant Sensitive Plant	*Mimosa diplotricha*
2	Hymenachne	*Hymenachne amplexicaulis*
2	Pond Apple	*Annona glabra*
2	Sicklepods	*Senna obtusifolia, S. hirsuta & S. tora*
2	Blue Thunbergia	*Thunbergia grandiflora*
3	African Tulip Tree	*Spathodea campanulata*
3	Aristolochia or Dutchman's pipe	*Aristolochia spp. other than native species*
3	Camphor Laurel	*Cinnamomum camphora*
3	Harungana	*Harungana madagascariensis*
3	Lantana	*Lantana spp.*
3	Singapore Daisy	*Sphagneticola trilobata*

In addition, the Federal Government has proclaimed Pond Apple, Hymenachne and Lantana as "Weeds of National Significance" and in the past has provided grants to help control them.

Use these Government priorities and a few additional weeds such as the 'not so sweet' 16 weeds listed below, to determine your weed management priorities:

Watch out for these weeds

1. Harungana *(Harungana madagascariensis)* is native to tropical Africa where it grows as a pioneer tree. In north Queensland it is mainly a weed of disturbed edges. It has distinctive broad, egg-shaped, opposite leaves with a golden undersurface, and bears small whitish, fragrant flowers.

2. Pond Apple *(Annona glabra)* was introduced for local horticultural development of the custard apple, but is now an extremely serious pest. It invades wetlands, swamps, mangroves or any wet areas such as creeks or cane drains. Pond apple forms dense thickets preventing the regeneration of native species.

3. African Tulip *(Spathodea campanulata)* is a popular ornamental tree that has colonised rainforest across north Queensland. African tulip is rapidly spreading in the ranges behind Darradgee. Young trees can be pulled out manually when soils are moist. Due to their suckering habit, chemical control of larger felled trees is required.

4. Allamanda *(Allamanda spp)* are yellow and purple flowering vines which were introduced as garden plants, but are now common on some edges where they smother native vegetation. Vines can be cut off at the base and either dug out or treated with a cut stump chemical treatment. Dispose of cuttings carefully.

5. Thunbergia *(Thunbergia grandiflora)* is an aggressive vine easily recognised by its sky-blue tubular flowers. It can smother large trees which pull down many others as they fall. Underground tubers weigh up to 70kg, making control difficult.

6. Siam Weed *(Chromolaena odorata)* has a growth habit similar to Lantana. It is a fast-growing, scrambling shrub capable of smothering vegetation, even large trees. Its soft, serrated leaves and pale lilac flowers look similar to Blue-top *(Ageratum spp.)*.

7. Singapore Daisy *(Sphagneticola trilobata)*. This plant was introduced widely as a ground cover. It is a very aggressive and competitive plant, growing to 300mm tall and smothering native ground layer vegetation. It is a common weed of waterways and edges in the Johnstone Shire, spreading easily from cuttings. Slashing and mowing may only spread it further. Persistent control is required to eradicate this pest.

8. Sicklepod. *(Senna obtusifolia)*. Sicklepod is a vigorous and competitive shrub growing up to 2.5m high. Although an annual plant it will often re-shoot and flower after slashing. It is common in overgrazed pastures and along rivers and floodplains.

9. Giant Sensitive Weed *(Mimosa diplotricha)*. Incredibly thorny with bright green leaves, this sprawling plant has leaves that are only slightly sensitive to touch. It is a close relative of common sensitive weed, those painful thorns often encountered while gardening and tree planting.

10. Hymenachne *(Hymenachne amplexicaulis)*. An aggressive weed of wet areas first introduced as a ponded pasture grass. It chokes waterways and destroys aquatic habitat. Sensitive control is required due to its association with waterways. Be very careful using any chemical controls.

11. Guava *(Psidium guajava)* is a small, woody tree which is easily spread by birds and bats. Smaller individuals can be hand pulled but chemical application by stem injection or cut stumping is required for larger trees.

12. Lantana *(Lantana camara)*. Lantana is the world's most widespread tropical woody weed. Poisonous to stock, it is a common weed of rainforest margins. Large clumps can be pulled by hand, 4WD or tractor. Chemical controls include foliar sprays, stem injection, basal bark application or cut stumping.

13. Praxelis *(Praxelis clematidea)* arrived in Australia in the early 1990s and has spread rapidly across northern Queensland and its control will be difficult. Although most commonly a weed of disturbed areas and roadsides, it also invades woodland areas.

14. Coffee *(Coffea arabica)* seems innocent in the backyard, but is a serious weed capable of invading the shady rainforest understorey and out-competing native species. Seeds are readily spread by birds. Seedlings can be hand pulled but chemical treatment is required for larger plants.

15. Para Grass *(Brachiaria mutica)* chokes wet areas and creeks. Like all grasses it is extremely competitive and will choke out young regenerating trees. Control in and around waterways can be problematic due to chemical restrictions and difficult access. Follow-up control will almost always be required. The plant dies out quickly once a degraded waterway has been replanted with native trees.

16. Guinea Grass *(Megathyrus maximus, syn. Panicum maximum)* is a tall competitive grass that can fuel fire when it dries out. Guinea grass can be controlled through continued slashing, although chipping out root systems or chemical help may be required to eliminate persistent stools. Wetting agents incorporated into chemical applications can help uptake through the hairy leaf surface.

Controlling weeds

Use the previous lists to help prioritise your weeds and then research control techniques to best manage them. Council officers can help you with strategies and techniques to control your weeds. The NRM&E website has fact sheets on how to control declared and environmental tropical weeds, and they are regularly updated to include the latest methods and chemicals.

There are different ways to control weeds depending on the area and equipment available. Weeds can be controlled by hand pulling, slashing with a tractor, shading them with taller plants, spraying with herbicide, and in some cases, with fire. The Wet Tropics Management Authority in conjunction with the Council provides a trailer-mounted Quickspray unit for landholders with extensive weed infestations. Ideally, chemical use should be minimised. Understanding the weed, and timing the chemical application under controlled conditions, will reduce your costs and increase the results.

Johnstone Shire Council's Matthew Hyde and World Heritage neighbour Norm Whitney check out the weedspray unit available for use by Shire residents.

Weed control near waterways

Our waterways are the lifeblood of our natural systems, farms and communities. They are also preferred by aggressive weeds and provide a natural conduit for them to spread. Herbicides can be harmful to aquatic life, making weed control on waterways very difficult. As a result, it is governed by legislation and subject to restrictions. Contact the Council or your local Landcare group for expert advice.

Valued pasture or weed?

Guinea grass is a valued pasture to some landholders but a pest to those trying to establish trees or control weeds on roads and waterways. Left ungrazed, guinea grass becomes an aggressive weed which dominates rainforest edges and stream banks. Overgrown guinea grass also feeds fire which can threaten properties and severely damage rainforest margins.

Prevent weeds from spreading

Preventing the spread of weeds is easier and cheaper than managing weed infestations.

- Beware of the friend with the give-away plant. Many freebies become a curse down the track, even if they're given to you as a source of food (eg. coffee, taro, mint).
- Avoid walking through weeds that are carrying seeds. Don't move from weedy to weed-free areas without cleaning shoes, clothes, equipment and vehicles.
- Ensure produce brought onto your property is free of weed seeds.
- Insist all machinery is inspected and cleaned before entering your property by asking the contractor to supply a voluntary vendor declaration.

Safety issues

Controlling weeds often requires the use of chemicals and machinery. Personal safety should come first, followed closely by environmentally responsible practices. The Innisfail TAFE College *(ph:* **4043 8622)** offers courses about how to safely use chemicals and machinery.

Follow-up

Initial weed control is only part of the weed management solution. Follow-up control or revegetation will be required to prevent weeds from returning.

For more information:

Johnstone Shire Council
Pest Management Officer
ph: (07) 4030 2264

Wet Tropics Management Authority
Priority weeds in the World Heritage Area are identified in the Wet Tropics Conservation Strategy, ph: (07) 40520524. Download a copy of the Wet Tropics Weed ID Guide from www.wettropics.gov.au

Department of Natural Resources, Mines and Energy
For current information on recommended control techniques and chemicals for any weeds, contact the South Johnstone office ph: (07) 4064 1155 or visit the website: www.nrm.qld.gov.au and search for "environmental weeds" and "declared weeds".

Innisfail TAFE
Flexible courses and workshops on Chemical Certification and ACDC (*Agricultural Chemical Distribution Control Act* Commercial Operators Licence). ph: (07) 4043 8653.

9. Feral perils

Feral animals damage crops, livestock, native plants and wildlife. They also carry diseases which harm humans.

Pigs

Feral pigs damage crops and forests and compete with native wildlife for food. They spread feral earthworms and pathogens such as Leptosporosis and rootrot fungus *(Phytophthora cinnamomi)*. Under state legislation, the *Land Protection (Pest and Stock Route Management) Act 2002*, local councils coordinate feral animal management, with policy advice from the Department of Natural Resources, Mines and Energy *(NRM&E)*. Landholders, including government agencies, are responsible for controlling pigs on land under their management.

Pigs may visit your property at certain times of the year as they move around the landscape following their seasonal food sources. If this is the case, contact the Council's Pest Management Officer on ph: **4030 2264.** The Council may have a spare pig trap you can borrow and they will be able to provide feral pig management information.

If you have a recurring pig problem, it's worthwhile getting your own trap. The Council or the NRM&E office at South Johnstone can provide specifications for a portable box trap. Local metal fabricators will charge about $600 to build a box trap, or if you're handy with a welder you can build one for much less.

A cheaper alternative is a mesh silo trap which will cost less than $200. It requires on-site construction but can be dismantled and moved to other locations as problems arise. If using a silo trap, you will need to attach a wildlife-friendly gate rather than a silo trap's standard spear gate, to prevent cassowaries from being caught. Council and NRM&E officers will also give advice on how to place bait material and the humane disposal of the pigs.

Pig shooting and hunting with dogs is not allowed in national parks within the World Heritage Area because of the danger to people and wildlife. While many local residents enjoy recreational pig hunting, studies have found it isn't effective in controlling pig numbers in rainforest. This is mainly due to the dense vegetation, and because pigs don't need to congregate at waterholes as they do in dry, open woodlands. In addition, some hunters like to retain a few breeding pigs in the wild for future capture. Poison baiting is generally not allowed in settled areas like the Johnstone Shire. However, in some situations where operations can be closely monitored, both hunting and baiting can be useful. *(Poison baiting is strictly controlled, contact NRM&E ph:* **4064 1155** *for advice.)*

Attach a wildlife-friendly gate to pig traps to prevent cassowaries from being caught.

Rats

The introduced Black Rat *(Rattus rattus)* is a common pest in untidy sheds and prefers weedy, run-down yards. The best way to control any rat is habitat management. Keep grass mown short in fruit orchards, around buildings and other work areas. Don't leave rubbish piles or other debris lying around.

Tilapia

Tilapia is a noxious fish which has infested the South and North Johnstone River catchments and competes for food and space with native fish populations. To prevent the Tilapia invasion spreading further,

- Don't use Tilapia as fishing bait.
- If you catch one, kill it immediately, don't return it to the river.
- Don't stock them in dams.

For more information about Tilapia, contact the DPI hotline **132 523** or website: **www.dpi.qld.gov.au/fishweb**

Feral deer

Small herds of deer have escaped from farms and are roaming on the edge of the rainforest in small groups. They have trampled revegetation plots and ringbarked trees by antler rubbing in the Palmerston, Mission Beach and Upper Darradgee areas. Over time, they may rival feral pigs as a major pest. The Wet Tropics Management Authority has begun an eradication program with the Queensland Parks and Wildlife Service. If you see feral deer, please contact the QPWS office in Innisfail on ph: **4061 5900.**

Feral dogs and cats

Feral dogs are becoming an increasing problem in the Shire. Some are dingoes cross-bred with domestic dogs, and others are pig-hunting dogs which have been lost or abandoned by their owners. These dogs are a great hazard to wildlife and domestic stock. Feral cats also have a major impact on wildlife, particularly on the rainforest margins.

For information on feral animal management, contact the Shire's Pest Management Officer on ph: **4030 2264.** Council traps for both feral cats and dogs may also be available. The Land Protection Officer at the NRM&E office at South Johnstone on ph: **4064 1155** can also provide useful advice on control options and methods.

Cane toads

These invaders eat insects, small mammals, frogs and reptiles and poison almost anything that tries to eat them.

You can help to reduce local cane toad numbers with regular toad hunts. Grab some plastic bags and a torch and check the compost bin, under street lights and near taps. Use the plastic bags as a glove to catch the toads, then humanely euthenase them in the freezer. (Don't forget to tie the bag tightly, and to remove the frozen toads the following day!)

Cane toad eggs look like a string of black dots encased in a clear piece of spaghetti. No native frogs lay eggs this way. Pull the egg strings out of the water to dry out in the sun.

An Interview with Mark Gallagher of Wadda Banana Plantation

The Gallagher family started their banana farm in 1972, when they purchased their original 75ha on the North Johnstone River. Since then the family has increased their holdings, now farming bananas and cattle on around 800 ha. The Gallaghers share a 6km boundary with the World Heritage Area along the river. Mark explains the family's farm management philosophy.

"We look at the farm as a whole – the rainforest patches, the bananas, the cattle, the river and even the World Heritage Area on the other side of the river. We know that what we do in one place ultimately affects what happens somewhere else."

Q. What does it mean to you to be a World Heritage neighbour?

"It's great to know it's always going to be there. Society's values have changed from the days of soldier settlement and clearing the land. We now know that we need to hang on to areas like that, so we are still able to enjoy them. We love going down the river for swimming and canoeing – when we get the chance. It's a great place to relax."

Q. You've planted over 35,000 native trees on the farm. What got you started and why natives?

"We're just replanting areas that we think should never have been cleared. In the past, they were areas that were costly to maintain - to keep weeds slashed and under control. Otherwise, the areas just become a haven for rats and pigs. By cleaning up the weeds and replanting native trees we were able to put in place a long term solution to those problem areas on the farm.

"It costs a bit initially, but it soon pays for itself. I can now drive past areas that we used to have to keep clean and just admire the trees.

"Other areas that we've planted are where creeks and gullies had been cleared and had silted up.

Above: Mark Gallagher.

"Initially, we got into one of the early timber plot schemes. But we wanted to plant more trees, not for timber, just native ones, to put back what was there. That's when we were put in touch with the TREAT / QPWS nursery at Lake Eacham. It's gone on from there."

Q: With such a big banana farming operation (employing over 100 staff), how do you find the time and the resources for tree planting?

"Tree planting is just like any other farm operation in our eyes. It's like growing another crop. You want to succeed... to reach your goal. Tree planting and their maintenance has to be just another farm job - as important as bell injecting or de-leafing.

"It's like pig trapping. We don't allow shooting here. Dogs will always end up straying or getting lost and causing a problem later. So we have a regular pig trapping program. Farm staff carry out the trapping program. It's not something that's left for a bit of spare time on the weekends. It's regular farm business. You have to demonstrate your commitment to these things."

Q: Have you finished tree planting yet?

"No…no." Mark says with a grin. "We've got a long way to go yet. It's a lifetime's work – but I don't want it to take that long."

10. Living with wildlife

Watching wildlife in your own backyard is one of the benefits of living in Australia's most biodiverse region.

The Wet Tropics World Heritage Area is considered one of the world's biodiversity hotspots, teeming with plant and animal life. Over 660 animal species are found in the region, which is over a third of Australia's animals. As locals, we tend to take this type of diversity for granted, but new residents will find the sheer diversity of wildlife remarkable. For instance, Tropical North Queensland has one of the most diverse bird populations in the world. Over 430 species have been recorded so far, more than half of Australia's species. They include birds of prey, owls, kingfishers, ducks and many rare and endangered species. This is because of the diversity of habitats found here - the wetlands, open forests, reef cays and rainforests.

Many animals and birds are visitors or permanent residents in wildlife-friendly backyards, including those in urban areas. By creating native habitat on your property, you'll enjoy the pleasure of wildlife near your home.

Attracting wildlife

- Plant a variety of local native flowering shrubs, vines and trees to attract birds and butterflies.
- Leaf litter and cool, moist areas will attract skinks, frogs and lizards.
- Ponds and bird baths are a sure way to attract native wildlife. Position them next to established plants so your visitors have an escape path.
- Restrict your cats and dogs to areas not visited by wildlife. Keep them on your property and out of the rainforest. Lock cats up at night to minimise their impact on native animals.
- Avoid using herbicides and pesticides.

Attract the Cairns Birdwing butterfly by planting food for its caterpillars, the vine Aristolochia tagala.

Investigating the natural world around you can be fascinating.

Mammal, bird and bat boxes

You can attract mammals, birds and micro bats by constructing nest boxes that recreate old tree hollows these animals rely on for shelter and to raise their young. Directions on how to build a bat box are available from the website: **www.batcall.csu.edu.au** and the website: **www.floraforfauna.com.au** explains how to build bird boxes. Alternatively, you can buy them ready-made from a number of sources. For example, try the internet (eg. **www.powerup.com.au**) or Eco-bat ph: **(0418) 195 136**.

Observing wildlife

Investigating the natural world around you can be fascinating – you'll discover many native animals and birds that share your property and neighbourhood.

To get started you need a notebook for a wildlife diary (records are very important) and a pair of binoculars (not essential but a great investment). Other optional items include sealable plastic bags for feathers/droppings, camera, torch, and access to wildlife reference books (see further reading list on page 40). Why not get started by using the wildlife recording sheet? (see page 34 or print from the Wet Tropics Management Authority's website: **www.wettropics.gov.au**) Remember, the objective is to observe without disturbing the animals and birds of the Johnstone Shire.

Kingfishers are common along waterways.

Birds

The Johnstone Shire is renowned for its extensive range of birds. A good field guide will help you to avoid confusion and identify your subjects. Most birds are active in daylight hours. You will be well rewarded by listening and observing birds during their morning and afternoon choruses.

Frogs

Listen for frog calls at night or after rain. Two people can shine a torch towards a frog's call from different directions, forming a triangle to help pinpoint the calling frog.

Reptiles and invertebrates

Searching under logs, rocks or bark can reveal a range of reptiles and invertebrates such as insects, spiders and snails. (Be careful to replace any disturbed habitat and beware of snakes or other potentially harmful wildlife.)

Leave out a white sheet with a light behind it at night to attract a vast array of moths and other night-time insects.

Other animals

Clever observation can include looking for tracks, droppings and other evidence of an animal's presence:

- Spread some fine, wet sand over a 1m x 1m area to act as a 'sand trap' for footprints.
- Regularly check around known drinking areas.
- Conical holes in your lawn are made by bandicoot snouts as they dig for food.
- Flying foxes suck the juice out of fig fruits and spit out a seedy pellet.
- Cassowaries leave very large calling cards – dung piles can weigh over 1kg!
- Many native mammals are most active at night and spotlighting is the easiest way to observe them. Stay well back from the animals and use only 30-50W bulbs to avoid dazzling their sensitive eyes.

Marine animals

Our coastal waters are full of an amazing diversity of marine life, and many residents enjoy fishing, snorkelling and diving around offshore islands. Occasionally, marine animals such as green turtles, dugongs and whales are stranded on our beaches. A False Killer Whale has been found at Bingil Bay and a Melonhead Whale at Maria Creek. If you see a turtle, dugong or whale stranded on a beach, immediately contact the Marine Hotline: **(1300) 360 898.** Autopsies and tags on dead animals can provide vital information for marine researchers.

An estimated 100,000 mammals and 700,000 seabirds die each year as a result of an encounter with plastic litter. Fishing line, netting, six-pack holders and other debris trap and strangle animals. Plastic is also eaten. An 8m Bryde's whale which died in Trinity Inlet near Cairns had six square metres of plastic in its stomach. Dead turtles are often found with plastic bags and fishing lines blocking their digestive tracts. It is also common for dead sea birds to be found with hooks lodged in their digestive systems. Boat owners and fishers can help by keeping rubbish on board, and beachside residents and visitors are encouraged to take a bag on your beach walks and pick up rubbish and litter.

Common wildlife of the Johnstone Shire

Spectacled Flying-foxes *(Pteropus conspicillatus)* and Little Red Flying-foxes *(P. alecto)* make up the main populations of fruit bats around the Shire. They play an important role as pollinators and seed dispersers. Both species have a bad reputation among farmers because they damage fruit crops.

Torres Strait Pigeon *(Ducula bicolor)* is also known as the Torresian Imperial or Pied Imperial Pigeon. In August each year, large flocks of these birds arrive from Indonesia-PNG for breeding, departing around February-April. Huge flocks commute daily from breeding islands such as Hinchinbrook, feeding on rainforest fruits on the mainland.

Striped Possum *(Dactylopsila trivirgata)* is a fast and agile possum restricted to Tropical North Queensland and Cape York. It has distinctive black and white striped markings. Striped possums often feed on beetle larvae in rotting wood and shredded timber is a telltale sign of recent possum activity. It has a specially elongated fourth finger to skewer out grubs. Striped possums are a shy and sparsely distributed animal, so little is known of their behaviour and ecology.

Wildlife Recording Sheet

Date	Name of Animal or Plant	Location	Notes
1ST SEPTEMBER, 2004	BLACK BEAN TREE	ON BEND OF LIVERPOOL CREEK NEAR PUMP SHED	RAINBOW LORIKEETS FEEDING ON FLOWERS

Agile Wallaby *(Macropus agilis)* with its white hind leg stripe can be seen in the East Palmerston area. Groups inhabit grassy areas, so a decrease in rainforest and increase in grassland (including sugarcane) has favoured their spread to former rainforest areas. They often fall prey to roaming dogs and are frequently killed by vehicles.

Red-legged Pademelon *(Thylogale stigmatica)* lives only in the rainforest. This small wallaby browses on a wide range of plants, fungus, leaves (fresh or dead on the ground), roots, stems of vines, insects, grass and some forest fruits. Dogs and traffic are significant threats to pademelons.

Antechinus *(Antechinus flavipes)* pronounced anti-kinus, this small, carnivorous marsupial is often mistaken for a pest rat or mouse and killed. It is a unique marsupial which enjoys a diet of mainly insects (including cockroaches), flowers, nectar and even small birds and house mice. They grow to around 10-12 cm long and weigh only 30-50g after a good feed. These frenetic animals are harmless to people and worth tolerating as native neighbours around your home because of their insect control capabilities.

Giant White-tailed Rat *(Uromys caudimaculatus)* can chew through just about anything – including plastic containers, tin cans and vehicle wiring. It is Australia's largest native rat and weighs up to 1kg. They are easily seen, but more often heard at night. Their white tail can often be seen held up above the ground as they scamper off when disturbed. You'll know where a White-tail has been feeding from the carnage it leaves behind – shredded food scraps, containers and other debris. Much of their time is spent in trees where they are agile climbers. They are also known to forage for insects, fungi, small reptiles, frogs, shellfish and bird eggs. These animals play an important role in dispersal of forest seeds.

Melomys *(Melomys burtoni and M. cervinipes)*. Two species of Melomys occur in overlapping habitats in Tropical North Queensland. Telling the difference between them is a matter for an expert's trained eye. The **Grassland Melomys** or **Burton's Climbing Rat** *(M. burtoni)* prefers grassland or open forest. They build a grassy nest in long grass or shrubs, about 1.2 m above the ground. Although a native species, they are a recognised pest of sugarcane. **Fawn-footed Melomys** *(M. cervinipes)* prefers the rainforest. It is an agile tree climber and forages widely in the canopy. Fawn-footed Melomys restrict their movements to forest.

These native rodents can become a pest in an open residence, but like all native animals they are protected. C4 *(ph:* **4068 7197***)* sell Elliott™ box traps to capture and release Fawn-footed Melomys, however relocating animals is often fruitless as they return or a new individual takes their place. The idea is to outsmart them! Keep food well stored and aim to Melomys-proof your home or at least certain rooms. If books, clothing and other chewables are not secure, they are fair game for nesting material.

Leptospirosis

Animals can spread diseases like leptospirosis, especially through their urine and faeces. Rats, in particular, can spread disease because they easily contaminate food preparation areas. The best defence is good personal and household hygiene.

- WASH YOUR HANDS!
- KEEP FOOD PREPARATION AREAS CLEAN!
- STORE FOOD PROPERLY!

Brown Tree Snake *(Boiga irregularis)* is at home around houses and sheds. Although venomous, they are rear-fanged and unlikely to inflict a venomous bite. However, they can be feisty if disturbed and will strike out with an open mouth, putting on quite a performance. They can vary in colour but are mostly a tan colour above with a salmon pink belly. They have a wide head with large eyes and a very narrow neck. People commonly see them curled up inside a bird cage, unable to squeeze back through the wire after a meal of eggs or birds.

Venomous snakes inhabit the Johnstone Shire. Snakes are best observed from a distance and avoided wherever possible. They will generally retreat from humans.

Pythons, including water pythons, are not venomous or dangerous. They prey on small animals including rodents and frogs. Having a resident python will help keep small mammal populations in check. Large pythons are capable of consuming animals as large as possums, pademelons and agile wallabies. These larger snakes seem to be adversely affected by loss of habitat and the reducing size of forest patches. They are at the top of the food chain and can live for many years. Like most snakes, pythons have an undeserved reputation as a pest and many snakes are killed or relocated. Traffic also takes its toll on pythons while they bask on warm roads. Like all native wildlife, pythons are protected by law.

A Tropical North Queensland family called a local vet to tend to a sick python that turned up at their place. Upon treating the sick snake the vet also discovered the family's missing cat. The cat's flea collar had made the snake quite ill indeed! The snake survived – but with a distinct dislike for feline food.

Bandicoots are commonly seen in the Shire. The **Long-nosed Bandicoot** *(Perameles nasuta)* is smaller and has much longer ears than the **Northern Brown Bandicoot** *(Isoodon macrourus)*.

Lace Monitor *(Varanus varius)* is commonly known as a goanna. Their favourite foods are bird eggs and nestlings but they're general scavengers. Discarded food scraps or open compost heaps will attract them. They are not usually aggressive but don't be tempted to handle or feed them.

Crocodiles can be found on the Shire's beaches, off-shore islands and even freshwater swimming holes.

Crocodiles

Estuarine crocodiles *(Crocodylus porosus)* live in saltwater and freshwater environments in the Johnstone Shire. They can occur on beaches, off-shore islands and even freshwater swimming holes many kilometres from the sea.

Crocodile numbers have increased since hunting was outlawed in 1972, but their long-term survival remains threatened by habitat loss and development along the coast. Problem crocodiles are trapped by QPWS officers and released elsewhere in the Shire if they are female and under 2m long. All other captured crocodiles are removed from the Shire.

Be Croc Wise:

- Don't swim where crocodiles live.
- When fishing, stand at least a few metres back from the water's edge- don't stand on overhanging logs over deep pools.

- Never leave fish scraps at the water's edge or your campsite.
- Don't dangle arms or legs out of a boat.
- Stay well back from any crocodile slide marks.
- Don't feed crocodiles – it is illegal and dangerous.
- Camp at least 50 m from any water's edge and at least 2m above high tide levels. Avoid areas where animals go to drink.
- Be more aware during the breeding season – September to April.
- Be especially careful at night, when you are more likely to encounter crocodiles.

Cassowaries

The Cassowary is a well known symbol of Tropical North Queensland. These large (up to 1.8m) flightless birds are an endangered species. It is estimated that less than 1200 birds remain in the Wet Tropics, bringing the birds to the brink of extinction. The Johnstone Shire contains one of the largest remaining Cassowary populations.

- Cassowaries live in rainforest and cover a large feeding area. They may also be found foraging in eucalypt woodland, mangroves and along beaches.
- Fruit makes up 99 per cent of their diet but they also dine on insects, snails, fungi, small mammals and even road kill.
- The Cassowary's thick, stout legs are used for fighting and their 80mm long inner toe is a formidable weapon.
- They can move through the thickest forest tangles with speed and agility.
- Cassowaries drink water and enjoy a bath. They can't fly but they are good swimmers.
- Birds come together to mate around May to June. After the female lays a clutch of up to five eggs, she will move on to another male.
- The male sits on the eggs for up to 50 days without leaving to find food or water. When the chicks hatch, they follow their protective fathers around for about seven months, before launching out on their own.

Residents can help by revegetating land for Cassowary habitat and wildlife corridors.

"Between 1986 and 1992, 26 cassowaries were killed on roads around Mission Beach. Road deaths have declined since warning signs went up in 2002. Now the biggest problem for cassowaries is people feeding them. We had a fatally injured bird on the Tully Heads Road. The post-mortem showed it had just eaten chilli con carne, so the bird had been invited across the road to have a meal, and paid the price."

Brenda Harvey, C4 volunteer

What you can do to help

- **Plant more habitat.** More than 80 per cent of vegetation on the coastal lowlands between Cairns and Townsville has been cleared.
- **Avoid building boundary fences.** They can restrict wildlife movement.
- **Drive carefully**. Look for Cassowary crossing signs and slow down. Chicks may follow an adult bird across a road.
- **A fed bird is a dead bird.** Feeding Cassowaries makes them comfortable around humans and brings them into contact with roads and backyards where they become victims of road accidents or dog attacks.
- **Keep your dog in a fenced yard and under control at all times.** Dogs hunt down adult cassowaries to the point of exhaustion and death. Sub-adult birds and chicks are easy prey for dogs.
- **Record and report sightings of cassowaries.** If you see an injured, orphaned or dead Cassowary immediately contact QPWS Mission Beach ph: **4068 7183** or Innisfail ph: **4061 5900**.
- **Collect native fruit from your garden.** QPWS staff and volunteers need fruit for injured and orphaned chicks until they can be released back into the wild.
- **Make your pig trap cassowary-friendly.** Cassowaries can be literally "frightened to death" if accidentally caught in pig traps. Ask the Council for advice ph: **4030 2264**.

Don't feed wildlife

Even though it's tempting, close contact and feeding can threaten wildlife. Wild animals are capable of feeding themselves. Feeding:

- Interferes with an animal's naturally balanced diet.
- Leads to road kills as animals hang around looking for handouts.
- Builds dependency on people (catastrophic at holiday time).
- Artificially increases local wildlife populations.
- Is dangerous to people (eg. cassowaries, dingoes).
- Make animals vulnerable to predators.

For more information:

Innisfail Queensland Parks and Wildlife Service (QPWS)
ph: (07) 4061 5900
www.epa.qld.gov.au

Wet Tropics Management Authority
www.wettropics.gov.au

Birds Australia
www.birdsaustralia.com.au

Sustainable Gardening
www.sgaonline.org.au

Rainforest CRC
www.rainforest-crc.jcu.edu.au
ph: (07) 4042 1246 Fax: (07) 4042 1247
Rainforestcrc@jcu.edu.au

Australian Rainforest Foundation
www.arf.net.au
ph: (07) 4051 2000
The Foundation is working with land owners and government to create a cassowary corridor from Cairns to Cardwell.

Dog traps are available from the **Johnstone Shire Council** ph: (07) 4030 2222

The Council's Community Revegetation Unit can help to identify important Cassowary food trees on your property and suggest food plant species for your area.
(07) 4030 2287.

C4 volunteers staff the Wet Tropics visitor centre in Mission Beach, and provide cassowary food plants to land owners.
ph: (07) 4068 7197.

INJURED WILDLIFE

C4 ph: 4068 7197.

Mission Beach Wildcare
ph: (07) 4068 7272
fax: (07) 4068 7298
Email: wildcare@cassowaryconservation.asn.au
P0 Box 165 Mission Beach QLD 4852

HELP WITH SNAKES

Daytime:

Queensland Parks and Wildlife Service (07) 4061 5900

Innisfail Fire Brigade (07) 4061 0610

After 10pm emergencies only:

Innisfail (07) 4061 2283
East Palmerston (07) 4064 5198
Silkwood (07) 4065 4925
Mission Beach (0418) 793 104

Native plants suitable for planting in the Johnstone Shire

Botanical name	Common Name	Cassowary food plant	Suitable for smaller yards	Notes
Acmena hemilampra	Blush satinash	Yes	No	Good windbreak tree
Alpinia caerulea	Ginger	Yes	Yes	Edible fruit
Alstonia scholaris	Milky pine	No	No	Good shade tree
Alyxia ruscifolia	Native holly	Yes	Yes	Prickly foliage
Argyrodendron peralatum	Brown tulip oak	No	No	Good timber
Alphitonia incana	Sarsaparilla	No	No	Pioneer
Archidendron grandiflorum	Lace-flower tree	No	Yes	Beautiful flowers
Archonotophoenix alexandrae	Alexander palm	Yes	Yes	Good wildlife attractant
Aleurites rockinghamensis	Candle nut	No	No	Pioneer
Austromyrtus minutiflora	Lignum	No	Yes	Attractive foliage/flowers
Beilschmiedia obtusifolia	Blush walnut	Yes	No	Fruit pigeon favourite
Barringtonia calyptrata	Mango pine	Yes	Yes	Attractive flowers
Brachychiton acerifolius	Flame tree	No	No	Attractive flowers
Callistemon viminalis	Weeping bottle-brush	No	Yes	Flowers attract many birds
Carallia brachiata	Corky bark	Yes	Yes	Edible fruits
Canaga odorata	Perfume tree	Yes	No	Heavily perfumed flowers
Canarium vitiense	Canarium	Yes	Yes	Torres Strait pigeon favourite
Cardwellia sublimis	Bull oak	No	No	Widespread
Chionanthus ramiflora	Native olive	Yes	No	Pigeon favourite
Cordyline cannifolia	Palm lily	Yes	Yes	Many birds eat the fruit
Cryptocarya hypospodia	Northern laurel	Yes	No	Pigeon favourite
Cryptocarya mackinnoniana	MacKinnon's laurel	Yes	No	Colourful new growth
Cryptocarya murrayi	Murray's laurel	Yes	No	Pigeon favourite
Cryptocarya triplinervis	Brown laurel	Yes	Yes	Attracts many birds
Darlingia darlingiana	Brown oak	No	No	Attractive flowers
Davidsonia pruriens	Davidson's plum	Yes	Yes	Edible fruit
Dillenia alata	Red beech	No	No	Beautiful flowers
Dysoxylum muelleri	Miva mahogany	Yes	No	Attracts many birds
Dysoxylum parasiticum	Yellow mahogany	Yes	No	Attracts many birds
Endiandra insignis	Hairy walnut	Yes	No	Large trees!
Elaeocarpus angustifolius	Blue quandong	Yes	No	Wildlife favourite
Eupomatia laurina	Bolwarra	Yes	Yes	Primitive flowering plant
Ficus congesta	Water fig	Yes	Yes	Good for streambank revegetation
Ficus destruens	Rusty fig	Yes	No	Attracts many birds
Ficus racemosa	Cluster fig	Yes	No	Edible fruit
Ficus superba	Superb fig	Yes	No	Attracts many birds
Flindersia bourjotiana	Qld silver ash	No	No	Widespread
Flindersia brayleyana	Qld maple	No	No	Popular timber tree
Glochidion philippicum	Buttonwood	No	No	Pioneer

Botanical name	Common Name	Cassowary food plant	Suitable for smaller yards	Notes
Gmelina fasciculiflora	White beech	Yes	No	Good for streambank revegetation
Guioa lasioneura	Silky tamarind	No	Yes	Edible fruits
Helicia nortoniana	Norton's oak	No	Yes	Fruits attract many birds
Hibiscus tiliaceus	Cottonwood	No	Yes	Prune regularly
Homalanthus novo-guineensis	Bleeding heart	No	No	Pioneer
Homalium circumpinnatum	Brown boxwood	No	Yes	Flowers attract many butterflies
Leea indica	Bandicoot berry	No	Yes	Widespread
Licuala ramsayi	Fan palm	Yes	Yes	Flowers/fruit attract many birds
Litsea leefeana	Brown bollywood	Yes	No	Fruits attract many birds
Macaranga tanarius	Macaranga	No	No	Pioneer
Melaleuca quinquenervia	Paperbark	No	Yes	Likes poorly drained areas
Melaleuca viridiflora	Paperbark	No	Yes	Likes poorly drained areas
Melicope elleryana	Corkwood	No	No	Host plant for Ulysses butterfly
Melodorum uhrii	Zigzag vine	Yes	Yes	Edible fruit
Myristica insipida	Nutmeg	Yes	Yes	Fruit attracts many pigeons
Nauclea orientalis	Leichhardt tree	No	No	Use to revegetate wet areas
Neolitsea dealbata	White bollywood	Yes	No	Fruit attracts many pigeons
Pandanus conicus	Screw palm	No	Yes	Habitat for stick insects, crickets
Phaleria clerodendron	Scrub daphne	No	Yes	Scented flowers
Pilidiostigma tropicum	Apricot myrtle	Yes	Yes	Fruit attracts many birds
Pittosporum rubiginosum	Hairy red pittosporum	Yes	Yes	Rainforest shrub
Polyscias elegans	Celery wood	No	No	Pioneer
Pouteria obovoidea	Yellow boxwood	Yes	No	Fruit attracts many pigeons
Prunus turneriana	Almond bark	Yes	No	Common East Palmerston area
Scolopia braunii	Flintwood	No	No	Good butterfly attractant
Syzygium alliiligneum	Onionwood	Yes	No	Common East Palmerston & Mission Beach
Syzygium angophoroides	Lost dog	No	Yes	Edible fruit
Syzygium aqueum	Water apple	No	Yes	Edible fruit
Syzygium australe	Creek cherry	No	Yes	Edible fruit
Syzygium cormiflorum	Bumpy satinash	Yes	No	Flowers and fruit on the trunk
Syzygium kuranda	Kuranda satinash	Yes	No	Flowers on branches
Syzygium luehmannii	Cherry satinash	No	Yes	Attractive foliage
Syzygium sayeri	Pink satinash	Yes	No	Flowers attract many birds/insects
Syzygium tierneyanum	River cherry	Yes	No	Good for streambank revegetation
Syzygium wilsonii ssp wilsonii	Powder-puff lillipilli	Yes	Yes	Attractive flowers/edible fruit
Terminalia sericocarpa	Damson plum	Yes	No	Edible fruit
Ternstroemia cherryi	Cherry beech	No	Yes	Attractive foliage
Xanthostemon chrysanthus	Golden penda	No	Yes	Attractive flowers

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Helping Communities Helping Australia
An Australian Government Initiative

WET TROPICS MANAGEMENT AUTHORITY

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