Biodiversity Program

1. Program Scope

The Biodiversity Management Program for The University of Queensland, Heron Island Research Station, includes a range of biodiversity issues including:

- General guidelines while in a Marine Park and National Park;
- Turtles, Birds, Whales and Dolphins;
- Snorkelling, Diving and Reef Walking; and
- Vegetation Management.

2. Objectives

Environment Australia describes biodiversity as "the variety of all life forms: the different plants, animals and micro-organisms, their genes and the ecosystems of which they are apart".

The National Strategy for the Conservation of Australia's Biological Diversity provides the framework for protecting Australia's Biodiversity. The Strategy's stated aim is: "to bridge the gap between current activities and those measures necessary to ensure the effective identification, conservation and ecologically sustainable use of Australia's biological diversity".

The University of Queensland's Biodiversity Program aims to provide a set of procedures which will effectively address biodiversity issues throughout the University's campuses and sites. Within this policy statement, the University of Queensland will:

- Identify key biodiversity issues requiring control measures.
- Develop and implement strategies to manage the impacts of biodiversity issues that are ecologically sustainable, financially rewarding and technically feasible in accordance with The University of Queensland's Environmental Policy;
- Ensure compliance with environmental legislation, development approvals, lease conditions and other requirements; and
- Implement biodiversity management procedures and monitoring processes, subject to available resources.

3. Biodiversity Management Program

3.1 Biodiversity Management Strategies

3.1.1 Strategies

- Identify all processes that are threatening and/or reducing biodiversity (such as feral weeds and animals)

- Increase biodiversity over the long term by targeting and reducing those species and processes identified as responsible for reducing biodiversity.
- Protect and manage native flora and fauna through revegetation practices.
- When required, remove species threatening biodiversity in a humane way.

3.1.2 Application

Refer to Appendix 1 for Wildlife Protocols advised at Heron Island Research Station.

Appendix 2 details the vegetation management protocols at the research station.

3.2 Legislation

Permits may be required to relocate wildlife or guidelines may be available on the management of biodiversity issues. Information may be obtained from:

- Nature Conservation Act 1992
- Environment Protection & Biodiversity Conservation Act 1999
- Environment Protection and Biodiversity Conservation Regulations 2000
- National Strategy for the Conservation of Australia's Biological Diversity
- Environment Australia
- National Parks and Wildlife
- Marine Parks and Queensland Parks and Wildlife Service Regulations

3.3 Audits and Monitoring

Audit and monitoring programs will be set as required. It is the responsibility of the Manager Sustainability Operations of the Property and Facilities Division to set up audit and monitoring programs on the University campuses.

4. Training

It is the responsibility of the Heads of Schools and Centres, Managers of Farms and Research Stations and other Senior Officers to ensure that their personnel are adequately trained in environmental management issues.

Refer to the training program for further information.

5. Budget

It is the responsibility of the Property and Facilities Division to allocate the necessary resources to the Biodiversity Management Program on a yearly basis.

6. Records

All documents issued with respect to biodiversity are held by the Property and Facilities Division and/or farm and research stations as appropriate. The term documents for the purpose of the biodiversity program includes the following:

- Contracts;
- Operational Procedures;
- Checklists;
- Notes;

- Letters;
- Memoranda;
- Invoices; and
- Reports.

Appendix 1
Wildlife Protocols at Heron Island Research Station

General

All visitors and residents of Heron Island must act in accordance with Marine Parks and Queensland Parks and Wildlife Service Regulations including:

- No collection of anything within the park without a permit.
- Collection should occur within the A zone unless permit states otherwise (see map).
- Zones are denoted by markers on the beach and the edge of the reef.
- No fires.
- No sleeping on the beach.
- All living creatures are to be treated thoughtfully and with care.
- No littering (including leaving of field gear, ie. Stakes, tiles, tags, etc, out on the reef.

Turtles

Certain human activity, such as movement and the use of light, can disturb adult turtle nesting and reduce the survival chances of turtle hatchings.

- No torches or flash photography are allowed on the beach at night during turtle breeding season (October – April).
- Be aware that ambient lights from buildings can reach the beach – use blinds and curtains when necessary and turn off lights before leaving the building.
- Do not pick up hatchings.
- Do not come closer than 10m to adult turtles climbing up the beach.
- Never walk or stand in front of adult turtles.
- Do NOT ride or touch turtles on the beach and in the water.

Birds

The island is an important breeding site and home for any species of resident and migratory birds.

- Do not feed or leave food in areas accessible by the island wildlife.
- Always put food scraps into sealed plastic bags.
- If you accidentally fall into a mutton-bird burrow, please dig it out to ensure any chicks inside can still breathe.
- Do not get too close to birds minding their eggs or chicks.
- Birds covered in Pisonia seeds are to be left alone – it is a natural part of life on Heron Island.

Whales and Dolphins

The Environment Protection and Biodiversity Conservation Act 1999 and Regulations 2000 prohibits – killing, injuring and interfering with cetaceans. Interference includes harassment, chasing and herding of whales. The following guidelines are provided by Marine Parks:

- Boats must be no closer than 100 meters to a whale.
- Where there are three boats within 300 meters of a whale, additional boats must remain at least 300m from the whale.
- A person must not enter the water closer than 300 meters from the whale.
- When a boat is closer than 300 meters to a whale the operator must observe a 4 knot speed limit and avoid any operations which disturb the animal or cause it to change its behaviour.
- If there is a sudden change in whale behaviour, move away.
- Report sick, injured or stranded whales to a relevant authority.

Snorkelling, Diving and Reef Walking

Heron Reef has up to 200 visitors daily, continual minor destruction to the habitat can be devastating.

- Do not touch anything you do not know what it is.
- Be careful with your fins and limbs and please stay off the bottom.
- Collection is only permitted by permit.
- When reef walking please stay on the sand to avoid killing coral.
- Always wear protective footing and sun protection.
- Only step off the reef edge into deep water in areas designated by Heron Island Research Station staff, otherwise you will damage live coral.

Appendix 2
Landscaping Guidelines – Heron Island Development Zone
(extract from Heron Island Management Guidelines: November 1998)

1. Site Preparation

a) Grassed and weed infested areas: 'Bed Planting'

All grass and/or weeds should be removed and added to the mulch pile. The area should then be tilled to a depth of 300 to 500mm and 1200 layer of composted organic matter dug into the soil at this time. The beds should then be left to settle for a couple of weeks prior to planting. Note that bed planting is:

(a) A technique for high density planting in outer resort areas and
(b) A permanent feature in the central area.

Beds in outer area after planting will be allowed to reintegrate into adjacent grassed areas and the edge definition will fade.

b) Individual planting sites: 'Infill Planting'

Where specimen plants are to be planted in grassed areas, separate clearings of approximately 1 metre diameter should be cleared and treated as above.

c) Compacted areas

Compacted soils should be ripped with tractor-drawn tynes for large areas or a hoe for small areas to a depth of 500mm. Composted mulch should then be incorporated into areas to be planted. Ascertain location and depth of services before carrying out this operation.

d) Edging of garden areas

A defined edge between garden beds and pathways or grassed areas is necessary to retain mulch and reduce spread of grass into beds. Two examples of appropriate garden edges are shown in Detail 1 attached. Noted that bed style varies. In outer resort areas after planting is complete grass will be reintroduced.

e) Fertilising

Additions of fertilizers are not required for recommended species.

f) Mulching

Additions of mulch or composted organic matter is important for the following reasons:

- Preserves soil moisture.
- Maintains more even soil temperature.
- Helps to eliminate weed growth.
- Adds nutrient.

Two grades of organic matter will be useful:

Large diameter stems and scraps can be incorporated through a mulching machine for either grade of mulch. Optimum ratios of contents and methods of composting are outlined in C.S.I.R.O. Division of Soils, 1978, Discovering Soils No. 3 'Composting – Making Soil Improve from Rubbish'.

Grade (ii) organic matter (above) should be laid over.

2. Planting Procedures

a) Container plants

Excavate for each plant a square hole 200mm wider and deeper than the container. Place approximately 5 litres of water in each hole just prior to planting and allow to soak away. Ensure soil in pot is moist and remove plant with minimal disturbance of the root ball.

Place plant in hole and backfill firmly around roots retaining a slight depression around the stem of each plant at ground level.

Water in well with 5 litres water per plant.

b) Cuttings – (pisonia, Pandanus)

Excavate for each cutting a hole approximately half the length of the cutting. Remove the majority of the foliage from each section and place the cut end or base gently in the hole. Backfill firmly, retaining a lsight depression at the surface. Water as for container plants.

c) Open root stock

Make a wedge-shaped slit in the prepared ground deep enough to accommodate the roots. Flick roots gently into the hole to ensure they lie properly. Firm soil around roots retaining a slight depression around the stem. Tip-prune each plant and water as for container plants.

d) Transplants

Moisten soil well around plants to be transplanted. Moisture retention is critical for successful transplants and roots should be kept moist at all times. Foliage tips should be removed at time of transplanting – 25mm from each branch is sufficient. Generally, smaller plants transplant more successfully than large plants.

Dig a trench around the plant at the drip line (Detail 2) and as deep as possible to minimise root damage. Lift the root ball and place in bucket or on a sheet material to transport to planting site in one piece. Planting procedure is as outlined for container plants.

e) Plant massing and selection

Plants of the same species should be grouped together in natural looking arrangements. For an example of plant massing see Detail 3 attached.

Selection of plants should be made on the following basis:

1. Refer to area landscaping drawings, typical detail drawings and specific section drawings. Determine height, nature and site requirements (eg. Shrubs to 2m, shaded site or tree to 6m, open canopy, exposed aspect).
2. Refer to planting schedules provided. Select plants form groups determined above, selecting Category A (Heron Island) plants before Category B (Bunker Cays), and both of these categories before Category C (Capricorn Maritime). Refer also to availability. In selection, do not plant Pisonia trees directly over walkways and recreation areas.

3. Maintenance

a) Watering

Recommended species are adapted to low nutrient and moisture availability and the harsh climatic conditions of the Island and should develop quite well with natural rainfall if planted during the wet season. However, provisions of a trickle irrigation system in planting areas will increase growth rates, minimise stress and create a year-round greener appearance.

Constant soil moisture to the root ball during the first three months of establishment in recommended for strong initial growth. Pipework should be placed at a depth of 50 to 100mm. Outlet holes should be provided near the base of each plant.

Infrequent deep watering (300 to 500mm) is preferable to frequent shallow watering to encourage deep root growth, thereby reducing the incidence of drought stress and uprooting by winds. Depp watering twice a week is recommended until plants are established.

b) Pruning

Judicious tip pruning (top 25mm of branches) will benefit most shrubs and groundcovers encouraging a dense growth and bushy habit.

First pruning should occur at planting. Subsequent pruning is best undertaken after flowering. Use sharp secateurs. Do not attempt a general prune of all species in one season. Flowering and fruiting times, health of plants and weather conditions will dictate time for pruning.

Do not burn or dump prunings which are not affected by pests or disease, but recycle these in the composting system just drop them under plants to supplement the mulch.

Radical pruning should only be employed in critical areas, eg. Where branches protrude over pathways or to clear storm damage. Sharp pruning saws for heavy boughs and good quality secateurs or pruners for smaller diameter branches should be employed.

Each step listed below should be followed for radical pruning:

(i) Use clean sterile tools to prevent disease.
(ii) Cut large boughs progressively in section from tip to base.
(iii) For finishing cut, first cut upwards through branch for half its depth, then complete the cut downwards to remove branch. Branch stub should be cut back as close as possible to trunk and with a sloping finish to shed water.
(iv) Immediately apply coat of grafting mastic such as Colgraft to the cut surface to seal against rot and fungal attack.

c) Staking

In general, staking of plants is unnecessary and only serves to create a weak plant which depends on the stake for support. However, staking may be necessary in very exposed situations. In these cases place three stakes around each plant beside the root ball and tie around them so that eh plant can move within the enclosure.

d) Control of introduced species

It is possible for seeds from introduced ornamentals to be dispersed to natural areas of the Island by wind or birds. To eliminate this possibility, such species should be pruned after flowering to prevent seed from setting on the plants.

e) Plant loss and replacement

Dead, dying or disease-ridden plants should be removed to reduce spread of further pest and disease problems. Diseased plants should be removed from the Island.

Use of species lists and landscape drawings

Landscape drawings are provided as:

L1 – Typical treatments, all areas and special details – Lodges.
L2 – Western (Lodge) area plan.
L3 – Central (90's to 70's) area plan.
L4 – Eastern (Harbour) area plan.
L5 – Typical sections through building clusters.

The planting types noted o the drawings represent intent, and should be interpreted with the aid of the sections drawn on drawings L1 and L5.

The landscape height in various areas indicated represents an average height. To achieve this selection of plants for the site will include primarily those within the relevant category in the species lists attached, with additional plants from the next lowset category (at the edges) and feature plants from the next highset category where appropriate.

Example: At the rear of the Reef Suites planting is called up on the sections as 'shrubs to 2400' and on plan zones as 'screen planting to 3.0m'.

Therefore primary selection would be from species lists, Table 1, 2 or 3, as suitable and available, Group 'Tall Shrubs 2.0 – 3.0' with additional 'Groundcovers/Procument Shrubs (<1.0m)' at the edges and occasional 'Small Trees 3.0 – 5.0m' where gaps occur in the existing natural canopy.

Selection of species within groups

Design function: It is important that Category E (Wildlife Habitat) trees and tall shrubs should be kept away from buildings and from over proposed trackways.

Bed or infill planting

Bed planting should be restricted to those areas where an immediate dense response is required: eg. Between tracks and guest verandahs (Diving Lodges), the bed immediately in front of the Capricorn toilet block or in the Central area typically.

Infill planting should be used for planting larger areas (eg. Thicket stiffening at West end or Lodge complex) and against existing tree stands away from tracks (eg. Units 24-26, 26-28, etc).

Alternate growing habits

Note that the final growth habits of plants will be influenced by situation; where this effect is pronounced it is specifically noted the in the tables.

For example: Table 1 – Native mulberry; Argusia

Table 3 – Coastal lilly-pilly; Indian funeral tree; mongo.

Key to species list (Table 1 to 3)

Exposure:

Exposed position	E
Semi-exposed	SE
Protected	P

Situation:

Sunny position	S
Part-shaded	PS
Shaded	SH

Design function:

Provides shade (suppresses weed growth, shades use areas)	A
Provides wind protection (decreases salt-blast, protects use areas, building and less salt-tolerant vegetation)	B
Provides screening (visually separates use areas, provides privacy and enclosure to buildings)	C
Provides stabilising cover to substrate (binds the soil, provides green mulch, suppresses weed growth)	D
Provides wildlife habitat (provides nesting sites and materials for birds)	E
Provides leaf litter (adds nutrients and structure to the soil, suppresses weed growth)	F
Provides food for birds (provides source or nectar or fruit)	G

Availability:

Seedlings available from nurseries in Rockhampton	1
Seedlings available from other sources (BPA)	2
Seeds available	3
Seeds required	4
Transplants possible	5
Not recommended for planting at this time	6

Table 1. Heron Island Species

Species	Common Name	Growth Habit	Exposure	Situation	Flower Colour	Design function	Availability	Comments
Ground Covers/ Procumbent shrubs (<1.0m)								
Boerhavia tetrandra	Hogweed/ tarvine	Dense, spreading	SE/P	S	White	D.E	5	Sticky seeds
Canavalia rosea	Beach bean	Trailing, twining	E/SE	S	Purple	D,E	5	N-fixing
Commicarpus insularum	Gum fruit	Open scrambling	P	S/PS	White	D	5	Sticky seeds
Euphorbia tannensis	Spurge/ caustic	Compact, domed	SE/E	S	Yellow/green	D	5/4	Fine foliage
Portulaca oleracea	Pursland/ pigwood	Dense, compact	SE/P	S	Yellow	D	5	Succulent
Tribulus cistoides	Bull's head	Dense spreading	SE/P	S	Yellow	D	5	Sharp seeds
Grasses								
Lepturus repens	Stalky grass	Creeping or tufted	E-P	S		D,E	5	Common
Sporobolus virginicus	Saltwater couch	Dense, tufting	E	S		D	5	Salt tolerant
Thuarea involute	Bird's beak grass	Dense, creeping	E-P	S/PS		D,E	5	Coloniser
Low shrubs (1.0 – 2.0m)								
Abutilon indicum	Chinese lantern	Open, compact	SE/P	S	Gold	B,D	1/5	Showy flowers
Achyranthes aspera	Chaff flower	Coarse, domed	P	S	Red	B,D	6	Coarse herb
Yedelia biflora	Beach sunflower	Dense, straggling	SE/P	S	Yellow	D,E	5	Forms thicket
Solanum americanum	Black nightshade	Open, erect	E/SE	S	White	B,G	6	Edible fruit
Tall shrubs (2.0 – 3.0m)								
Argusia argentea	Octopus bush	Dense, compact	E/SE	S	White	B,C,D,G	1	Traps sand
Scaevola sericea	Cardwell cabbage	Dense, compact	E/SE	S	White	B,C,D,G	1	Deep stabiliser
Suriana martima		Dense twiggy	P	S	Yellow	C,D,E	1	Fine foliage

Table 1 (cont). Heron Island Species

Species	Common Name	Growth Habit	Exposure	Situation	Flower Colour	Design function	Availability	Comments
Small trees (3.0 – 5.0m)								
Celtis paniculatus	Investigator Tree	Slender, weeping	SE/P	S/PS	Cream	A,C	3	Spreading canopy
Cordia subcordata	Sandpaper fig	Open, stunted	SE/P	S	Inconspicuous	A,C,G	1/2/4	Semi-deciduous
Pipturus argenteus	Native mulberry	Open, variable	SE/P	S/PS	Inconspicuous	A,D,G	4/5	Edible fruit
Tall Trees								
Canuarina equisetifolia	Coastal she oak	Open, pendulous	E/SE	S	Red	A,B,D,G	1	N-fixing
Pandanus sp	Screw pine	Dense compact	SE/P	S/PS	White	A,B,F	4/5	Specimen tree
Pisonia grandis	Pisonia	Dense, spreading	P	S/PS	Greenish	A,C,E,F	5	Sticky seeds

Table 2. Bunker/Capricornia Species

Species	Common Name	Growth Habit	Exposure	Situation	Flower Colour	Design function	Availability	Comments
Ground Covers/ Procumbent shrubs (<1.0m)								
Ipomoea pes-caprae	Goat's foot convolvulus	Open, trailing	E/SE	S	Purple	D,E	2/4/5	Coloniser
Trachymene sp	Beach carrot	Cushion herb	E	S	White	C	3	
Sesuvium portulacastrum	Sea purslane	Sprawling herb	E/SE	S	Pink	D	4/5/1	Succulent
Canavalia rosea	Beach bean	Open, trailing vine					5	
Grasses								
Spinifex hirsutus	Beach spinifex	Open, trailing	E/SE	S		D,E	5	Coloniser
Tall shrubs (2.0 – 3.0m)								
Myoporum acuminatum	Boobiella	Dense, variable	E	S	White	A,B,C	4	Purple fruit
Plumbago zeylanica	Native leadwort	Open, straggling	SE/P	S	White/blue	A,C	4/5	Prune to shape
Small tree (3.0 – 5.0m)								
Ficus obliqua	Strangling fig	Dense, spreading	P	S/PS	Red	A,E,F,G	2/4	Edible fruit
Sophora tomentosa	Silver bush	Open, compact	E/SE	S	Yellow	B,C,D,E	1	Silver foliage
Climbers								
Ipomoea macrantha	Moon flower	Scrambling vine	SE/P	S/PS	White purple	C	3/4/5	Hangs from tree tops

Table 3. Recommended native specimen plants from central and northern coastal environments

Species	Common Name	Growth Habit	Exposure	Situation	Flower Colour	Design function	Availability	Comments
Ground Covers/ Procumbent shrubs (<1.0m)								
Canavalia tormentosa	Funny beach bean	Creeper	SE/E	S	Orange brown	D	4	
Hibbertia scaudeus	Goldent guinea vine	Prostrate shrub, twining creeper, climber, prostrate shrub	SE/E	S/PS	Yellow	D (ground cover or screen for building)	1	Variable growth depending on location.
Myoporum sp		Prostrate shrub	SE	S	White	D,F (ground cover)	4	
Lippia nodifolia	Condamine couch	Prostrate herb	P	PS	Yellow	D (ground cover)	1	Vigorous but containable herbaceous groundcover, may be mowed
Low shrubs (1.0 – 2.0m)								
Austromyrtus dulcis		Shrub	P	PS	White	D,G (low decorative shrub)	1	White to mottled purple, pea sized fruit is edible
Dodonea viscosa	Native hop	Small shrub			White		4	
Tall shrubs (2.0 – 3.0m)								
Eugenia reinwarditona	Coast lilly-pilly	Tree to low spreading shrub	P/SE	S/PS	White	A,G (specimen plant)	4	Round red edible berries
Guettarda speciose	Indian funeral tree	Shrub or small tree	P/SE	S/PS	White	A,G (specimen plant)	4	Shrub or small tree found near to beach, strong fragrant perfume
Poutenia sericea	Mongo	Shrub to small tree	SE/E	S		B,C (hardy screen plant)	4	Readily cultivated as a hardy hedge or screen

Table 3 (cont). Recommended native specimen plants from central and northern coastal environments

Species	Common Name	Growth Habit	Exposure	Situation	Flower Colour	Design function	Availability	Comments
Small tree (3.0 – 5.0m)								
Mallotus phillippensis	Red kamala	Small tree to about 6.0m	P/SE	S	Inconspicuous	A,G (specimen plant)	4	Small useful specimen tree with dense foliage and showy bunches of red fruit
Terminalia catappa	Sea almond	Small tree	P/SE	S	Inconspicuous	A,G (specimen plant)	1	Distinctive layered tree deciduous in late winter to spring preceded by spectacular red leaves prior to leaf fall.
Tall trees								
Barringtonia asiatica		Tree 10.0m	P	S	Red	A (specimen plant)	4	Good showy specimen tree
Cerbera manghas		Tree	P/SE	S	White	A (specimen plant)	4	Good showy specimen tree
Cupaniopsis anaricardioides	Tuckeroo	Tree 4.0-8.0m	P/SE	S	Inconspicuous	A (specimen plant)		Good showy tree, very hardy dense foliage, showy clusters or orange/red/black fruit
Dellinia alata	Golden guinea tree	Tree to 20.0m	P/SE	S/PS	Gold	A (specimen plant)	4	Specimen tree with large golden flowers and red papery bark

Table 3 (cont). Recommended native specimen plants from central and northern coastal environments

Species	Common Name	Growth Habit	Exposure	Situation	Flower Colour	Design function	Availability	Comments
Climber								
Clarodendron inerne		Rambler	P/SE	S	White	C (screen for building, fences)	1	
Hibbertia scaudeus	Golden guinea vine	Prostrate shrub, twining creeper, climber	SE/E	S/PS	Yellow	D (ground cover or screen for buildings)	1	Variable growth depending on location
Jasminum aemulum	Native jasmine	Creeping, climbing vine	P	S/PS	White	C (screen for building, walkways, fences)	4/5	Fragrant sprays of white flowers

Landscaping: current landscaping plans

Implementation of landscaping plans at Heron Island Research Station has been and continue to be the responsibility of the research station within its lease.

To assist in this process the Department of Environment and Heritage Protection (EHP) have developed detailed landscape plans for the Research Station as it is located on a Special Leave over Heron Island Nation Park. In addition to this, EHP have arranged through cooperation with their BPA nursery on Stradbroke Island for the commercial supply of seedling of species indigenous to Heron Island and the Capricorn Bunker Group cays.

An important element in developing continuity in the landscape environments throughout the island is the implementation of the same treatment of recurring common landscaping issues.

This section presents current landscaping as well as recommended concept solution for the treatment of these issues when the need for landscaping arises.