



Queensland Electricity  
Supply Industry (QESI)  
Maintenance Code for the  
Wet Tropics World Heritage Area



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Collated by Kim Forde (Environmental Officer – Stanwell 2000)

## INTRODUCTION

The Queensland Electricity Supply Industry (QESI) in conjunction with the Wet Tropics Management Authority (WTMA) has developed an Environmental Code of Practice for operating in the Wet Tropics World Heritage Area.

The WTMA has also issued each member of QESI with a permit that allows them to conduct maintenance activities in the area. (QESI members who have assets in the Wet Tropics World Heritage Area are Ergon Energy, Powerlink Queensland and Stanwell Corporation.)

This document summarises the requirements of the permits and the Environmental Code of Practice. It is a quick reference guide for field staff and contractors when work is carried out in the Wet Tropics World Heritage Area.

**All field staff and contractors must be adequately trained before commencing work in the Wet Tropics World Heritage Area.**

## WET TROPICS

The Wet Tropics World Heritage Area has been internationally recognised for the significance of its natural features.

The area is significant because it is considered

- a “living museum” of rare and threatened plants and animals
- to have exceptional natural beauty
- It is also considered as part of a “living cultural landscape” by Rainforest Aboriginal peoples to whom it is significant spiritually, socially, economically and historically.

The primary management goal for the Wet Tropics is to implement Australia’s international duty to protect, conserve, present, rehabilitate and transmit to future generations the World Heritage Area.


Various pieces of State and Commonwealth legislation have been created to manage the Wet Tropics World Heritage Area. The most relevant legislation for the Electricity Supply Industry is the Wet Tropics Management Plan 1998. Under the Plan, infrastructure agencies must apply for a permit to build or maintain our assets within the Wet Tropics World Heritage Area.



## WET TROPICS PERMITS

Each QESI member has its own Environmental Policy, reflecting its commitment to protecting the environmental values of the Area.

The Wet Tropics Management Authority has issued a permit each to Ergon, Powerlink and Stanwell allowing all maintenance activities provided we adhere to the Environmental Code of Practice. **For any construction activities, a separate permit must be obtained from the Wet Tropics Management Authority.**

**Throughout this document you will see this symbol  where a permit is required to undertake works, either under the Wet Tropics Management Plan or other legislation.** Please ensure that the correct permit has been obtained prior to the commencement of works.

**You should also refer to any Environmental Management Plans that have been developed for each powerline corridor in Wet Tropics World Heritage Area before commencement of any works.**

## IMPACTS OF QESI ACTIVITIES

Electricity infrastructure can have both negative and positive impacts. Key threats to World Heritage values throughout the world are: clearing, especially canopy clearing; habitat fragmentation; disturbance of soil surface and streambanks; introduction of weeds and feral species and pathogens like *Phytophthora cinnamomi*.



*Powerline clearings are highly visible evidence of human presence in the Wet Tropics*

Within the Wet Tropics World Heritage Area, possibly the most significant man made features are the roads and powerlines. (Blurton, 1992). They are a prime source of:

- disturbance - during construction and ongoing maintenance, of vegetation and hydrological patterns; especially the closed rainforest canopy and clearing edges.
- habitat fragmentation - as they act as linear barriers to the passage of wildlife;
- increased access for weeds (undesirable plants) and feral animals which can out compete native species.

## ENVIRONMENTAL CONSTRAINTS IN THE WET TROPICS WORLD HERITAGE AREA

- **High Rainfall:** Much of the Wet Tropics region experiences annual rainfall greater than 1200mm, ranging up to 8000mm. Rainfall intensities in the Area are amongst the highest recorded in the world. 75 to 90 percent of the annual rainfall occurs in the “wet” season, between November and April, and Tropical cyclones are a feature of the region’s climate during this time.
- **Steep slopes** - the region contains tablelands and highlands, mountainous escarpments, coastal ranges and coastal plains, each having unique climate and vegetation.
- **Highly erodible soils** - decomposing granites make up much of the geology of the Area.

Each feature in isolation, or more commonly, any combination of the above conditions, means that appropriate timing and siting of construction and maintenance activities are essential to minimise these effects.

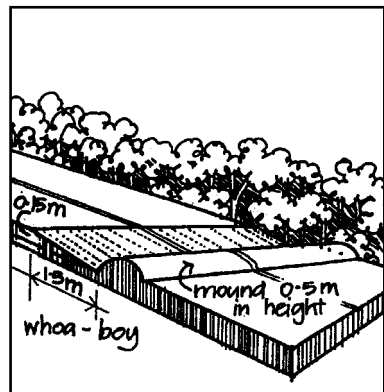
## EROSION CONTROL

General principles are to get water off the road surface quickly and to avoid cuts and fills where possible.

- The objective is to maintain access tracks and other assets in a stable, erosion-free condition. This requires effective drainage control especially in the more erosion-prone soils.
- Divert surface runoff away from disturbed areas.

### General controls

- All tracks should have drainage and erosion control.
- Drainage control is achieved by use of table drains, turn-out drains, ‘whoa-boys’ and culverts.
- Erosion control structures should be monitored at regular intervals and **more frequently during the Wet Season.**

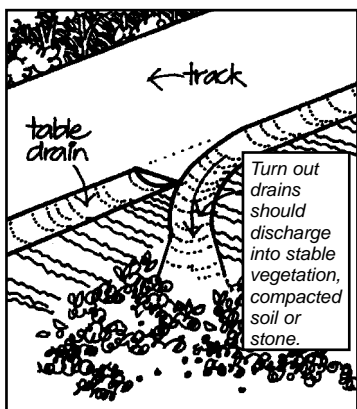


- Work areas should be defined (by flagging tape if necessary). Stay within those designated work areas to minimise the area disturbed.
- 'Whoa-boys' should be constructed above any slope and there after down the slope (including creek and gully crossings) at distances specified in Table 1 below.

**Table 1: Recommended spacing of cross drains**

Grade of drainage	Moderate hazard	High hazard
<5°	60m	30m
5 - 15°	40m	20m
15 - 25°	20m	10m
25°	10m	10m

- Tracks/roads should have table drains on each side. Drains should be as broad as possible ("U" shaped). V-shaped drains concentrate flows and are more prone to erosion and should be avoided where possible. It may be necessary to line the table and turn-out drain to prevent erosion caused by increased volumes and velocity.



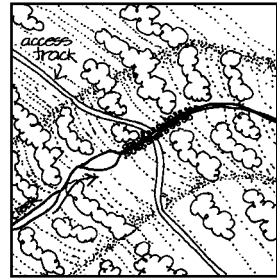
*Use frequent turn-outs and table drains to control lateral drainage.*

- Outlets to turn-out drains and 'whoa-boys' should be level and, where necessary, extended to discharge onto a vegetated or rocky area. The outlet should be compacted or, in more erosion-prone situations, lined with stone.
- **Limit Grading of tracks to those sections where erosion damage has occurred and table drains and turn-out drains have broken down. Where a ground cover exists and no erosion is occurring, access should be maintained by slashing, and grading limited to clean-up of drainage control structures.**

- Borrow pits should be avoided. Ensure that sources of fill material are free of weed seed and other contaminants. ⚡ A separate permit will be required to use or create **any** borrow pit in the Wet Tropics World Heritage Area.

## Creeks and gullies

- Cross creeks at 90° if possible. Approach and cross creeks slowly so as not to create wash and increase erosion. Cross below lagoons if possible. Retain riparian vegetation wherever possible.



## Tracks

- Hand clear (with a chainsaw) all fallen, dead or obstructing vegetation too large to be handled by slasher (> 8 cm diameter). Do not drive around any vegetation that may be obstructing the road, thereby creating side tracks in the bush. Instead, cut up obstructing vegetation and remove from access track.
- Where slips continue to occur or where repair is impossible, it is necessary to re-route the track. Contact the Environmental Coordinator before proceeding. **Any new route and its design must be approved by the Environmental Coordinator.** ⚡ A separate permit is required from WTMA for any new works (including tracks) in the World Heritage Area.

## Special erosion control structures

- In cases where high velocity or concentrated flows occur (eg where water must be transported down a steep grade before being discharged), specially-constructed chutes and energy dissipater structures are required. Contact the Environmental Coordinator.

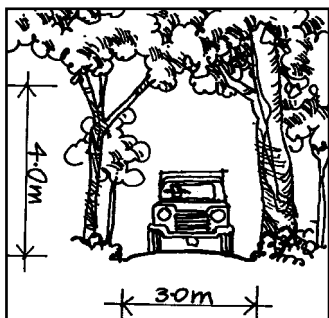


*Maintain gully vegetation under power lines*

## VEGETATION MANAGEMENT

An overriding principle is to reduce the extent of bare earth and to encourage vegetation that does not impact on line clearances. This includes using techniques that favour low growing and slow growing species, such as the selective clearing of rapid and tall growing species.

Ensure that no plant material is removed from Wet Tropics World Heritage Area during maintenance operations. The removal of plants, especially protected plants, ferns, orchids or timber is an offence under the *Wet Tropics Management Plan 1998* and the *Nature Conservation Act 1992*.



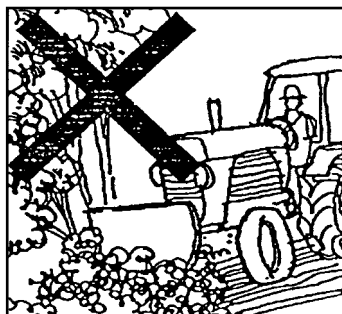
*Typical Track showing scale of vehicle with retained vegetation*

### Maintenance clearing under power lines or on access tracks

Vegetation clearing operations should retain existing vegetation and regrowth wherever possible. This means identification and field demarcation of retention areas. The objective is to maintain as much vegetative cover as practical while allowing for the safe passage of maintenance vehicles. This means retaining over-storey (canopy), mid storey (shrubs) and ground cover wherever possible.

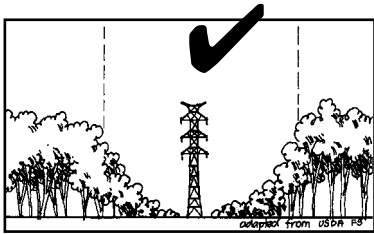
Retain canopy vegetation - especially in gully situations to ensure connectivity of wildlife habitat. Identify priority habitat areas for wildlife and appropriate management strategies to protect them with help from the Environmental Coordinator.

- Should works be outside the existing cleared areas, the Environmental Coordinator should define boundaries of vegetation areas to be retained. Marking areas with Flagging tape or a biodegradable marker, may be appropriate before issuing clearing contracts. Vegetation retention should be considered in gullies where pole locations and line sag permit.



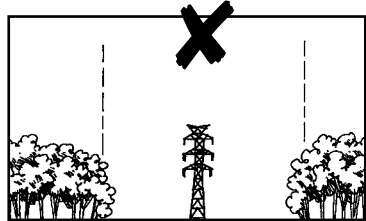
**Avoid clearing any vegetation on longitudinal access tracks with a blade on ground**, except when repairing or cleaning drainage control structures. Grading removes vegetation, destabilising the soil and encouraging erosion.

- **In most cases, maintenance operations should not require vegetation clearing to equal the original construction clearance width.**
- Encourage low growing species beneath power lines. These should be marked so they can be saved and encouraged.
- Revegetation should be undertaken in some areas to control soil erosion, reduce weed infestation and visual impacts as determined by the Environmental Coordinator.



- Consider scalloping and tapered clearing of edge vegetation as potential techniques for retaining vegetation within the corridor 'right of way'.

- Clearing boundaries should be defined by line sway, and determined after consultation with the Environmental Coordinator.



### Weed management

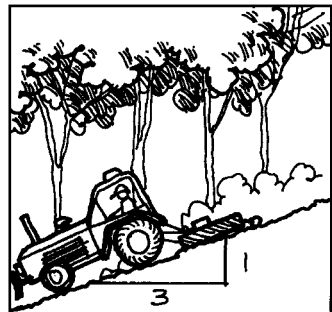
The objective is:

- to prevent the introduction of new weeds or the spread of weeds as a result of QESI activities in the World Heritage Area;
- to identify colonies or outbreaks of target weed species during routine maintenance or monitoring works, and report them to the relevant authorities.

Emphasis should be placed on controlling target weed species, as some weed species do not represent a major threat to ecosystems. Key locations such as pristine areas and along creeks should be given special attention. Key exotic species that are known to be destructive to native ecosystems have been identified within the Wet Tropics World Heritage Area. These are generally easy to identify. Photographs are in Appendix 1. To assist in weed control, please report any of these weeds, if found, to the Environmental Coordinator. Seek advice on control/eradication procedures.

### Mechanical and chemical clearing

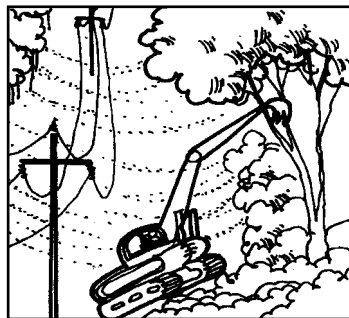
Clear only the minimum amount of vegetation required to disentangle fallen power lines in retained vegetation areas, eg gullies. Trees and vegetation should not be felled into creek beds. Allow only one creek track crossing per gully. Minimise soil disturbance and potential for erosion.



*Ensure operators do not exceed safe working conditions.*

Mechanical methods should be used rather than chemicals near creeks or rivers, or especially where rare and vulnerable species are known to occur. Mechanical methods include but are not limited to:

- Slashing regrowth vegetation (< 8 cm diameter) with a four wheel drive rubber-tyred tractor.
- "Tree Grabbers".
- **Bulldozer operated with blade off the ground (to avoid soil disturbance).**
- Chainsaws and other hand tools. These may be needed in steep or otherwise inaccessible areas or in particularly sensitive areas.
- When clearing trees, minimise damage caused to other vegetation and leave cut vegetation on site. **Minimise the stack height and don't stack the debris against the forest line.**



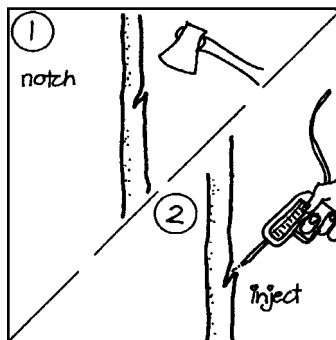
"Tree Grabber"

### Chemical Clearing (Herbicide Use)

The objective is to apply herbicides in the most efficient and selective manner without adversely affecting the environment.

Herbicides should be applied using one of the following methods:

- Stem injection. This technique is suitable for treating rapidly growing regrowth under power lines (eg Alphitonia).
- Stem injection together with foliar spraying. This method is for plants with stem diameters too small to inject and is suitable for areas difficult to access. Combining the two application methods decreases the return time for subsequent vegetation control. Foliar spraying is also suitable for treating herbaceous weeds in steep or otherwise inaccessible areas and around facilities (eg substations and power stations) where all ground cover must be cleared for safety reasons.
- Cut and swab. This method is suitable for large trees that must be felled to clear lines. Herbicide should be applied immediately after cutting.
- Cut stump. This method requires the freshly cut stump to be treated with herbicide within 30 seconds of the cut. It is effective for stems too small to treat by stem injection.



### Chemical Selection

- Only chemicals approved by the Environmental Coordinator should be used in the World Heritage Area. A list of all chemicals used will be updated regularly and held by the Environmental Coordinator.

### Mixing Chemicals and Refuelling

- Where possible, mixing and refuelling should be carried out prior to entering the World Heritage Area. This is particularly the case with foliar sprays.
- Any mixing/refuelling carried out in the field shall take place on a sealed contained surface in a well-ventilated area.
- Mixing ratio and methods shall be in accordance with manufacturer's guidelines.
- On open ground (ie outside a storage shed), chemicals should not be decanted, mixed, applied, stored or refuelling undertaken within 30 metres of a watercourse.
- When mixing or decanting anywhere within the Wet Tropics World Heritage Area, all care shall be taken to avoid spillage. Temporary bunding material should be laid down to catch any potential spillage.
- Leaking chemical drums, containers or machinery are not permitted within the Wet Tropics World Heritage Area, and if found, are to be removed immediately.



### Safe Application of Herbicides and Pesticides

- All operators must be trained in safe and environmentally sound practices of herbicide and pesticide use prior to commencing work in the Wet Tropics World Heritage Area.
- Only approved application equipment should be used.
- Broadacre spraying is not permitted by QESI in the World Heritage Area. Soil based application of residual herbicide is not permitted.
- Spraying should not take place in windy conditions.
- Advise the Environmental Coordinator immediately of any spill and seek advice on appropriate treatment and disposal of contaminant material.

### DISPOSAL OF WASTE

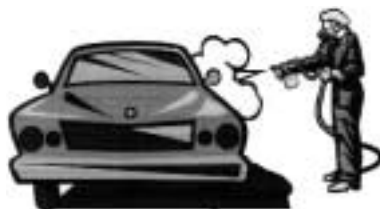


Dumping of **any** waste, such as paint, fuel, sump oil, grease cartridges, hydraulic oil and their containers, herbicides, pesticides, mixtures of, or their washes within the Wet Tropics World Heritage Area is prohibited. All these materials shall be removed from the site and returned to the store to be disposed of in an appropriate manner.

## Vehicle washdown procedures

Ensure all QESI vehicles and equipment (including all contractors plant and equipment undertaking work on QESI's behalf) working within the Wet Tropics World Heritage Area are in an environmentally clean condition.

- washdown and inspection of all QESI and contractors' equipment and vehicles at areas designated by the Environmental Coordinator before entering the Wet Tropics World Heritage Area, to remove weeds, soil and pathogens.
- All QESI maintenance equipment and vehicles which have worked in remote areas or areas with disturbed soil will be washed down on completion of the work.



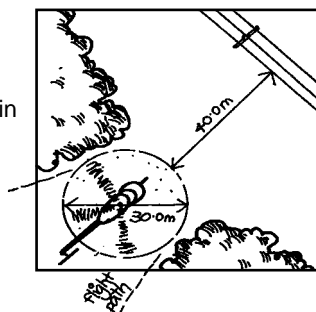
## Fire hazard

To minimise the occurrence of fire in the Wet Tropics World Heritage Area, maintenance operations should ensure that fire is not used as a maintenance tool, eg to clear vegetation. It may be used in certain areas, under strict controls and in liaison with the Wet Tropics Management Authority, to establish fire breaks.

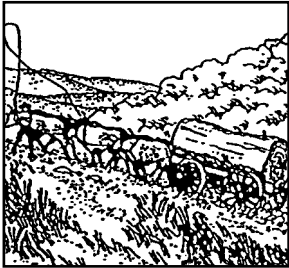
- When clearing vegetation, retain slashed vegetation as a well-distributed mulch layer across the line corridor. Ensure material is not windrowed, or pushed against the forest edge, as this may create a fire hazard once it dries out.
- Where fire-prone grass species (eg molasses or blady grass) are identified, these are to be maintained as low as possible. These species should not be used in revegetation.

## Helicopter Pads

Maintain helicopter pads and surrounding areas in a serviceable condition at all times. Refer to the full Environmental Code of Practice for the requirements of conducting helicopter activities within the Wet Tropics World Heritage Area.



## CULTURAL HERITAGE SITES



The objective is to manage QESI assets in a manner that minimises impact on cultural heritage sites. We are concerned with identifying and preserving sites which are significant as part of our cultural heritage. There are heavy penalties for destroying sites of cultural heritage significance.

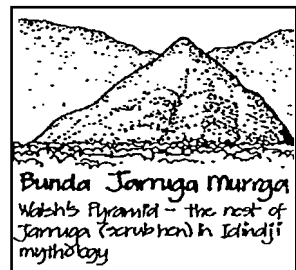
Cultural Heritage sites are those that contain physical evidence of past human activity, Aboriginal and non-Aboriginal, or have importance in history or traditional mythology and religion.

Sites can vary in size and complexity. For example, from a small scatter of stone artifacts under a tree, to a nineteenth century mine site which includes mine shafts, spoil heaps, old mining tools. Historical cultural heritage sites can include timber camps and mills, cane cutters quarters, remains of dwellings, sites of Chinese market gardens, explorers tracks etc.

### Aboriginal sites of significance

These sites are landscape features or other places which contemporary Aborigines identify as being of spiritual (mythological) or historical significance. They may include mission sites, burial sites and cemeteries, campsites, massacre sites and ceremonial sites such as initiation grounds.

These sites are not always easily recognised as there may be no obvious signs that Aboriginal people consider the area to be important. Their existence and importance can only be determined by the proper Aboriginal custodial group or by anthropologists who have worked in the area.

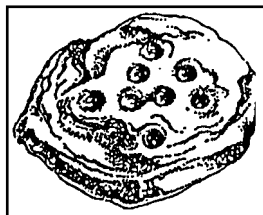


To summarise the legislation and its relevance to QESI staff and contractors:  
**It is illegal to remove, damage, destroy or interfere with any archaeological sites, and persons doing so are subject to prosecution and fines.**

### Procedures

If a site is found or suspected a Supply Corporations Environmental Managers Group (SCEMG) procedure for Accidental Discovery of Cultural Heritage Items or Places exists. In practical terms, this means:

- Don't touch or disturb anything including the natural landscape surrounding the site. The location of artefacts in relationship to each other and to natural features can be important in interpreting the significance of the site.
- Avoid walking or driving vehicles on or around it to keep disturbance to the minimum. Use surveyor's tape to delineate the area.
- Notify any other working parties in the area, so they can also avoid disturbing the site. However, only do so when absolutely necessary. Curiosity can lead to considerable, non-deliberate disturbance of the site.
- **Inform the Environmental Coordinator immediately, so the proper authorities can be contacted and advice sought.** Tell supervisory staff.



### Significance of Historical Sites

North Queensland has changed a lot in recent years and many of these old sites are rare. **Like archaeological sites, once they are destroyed, they can't be replaced and we may have lost a valuable key to our heritage.**

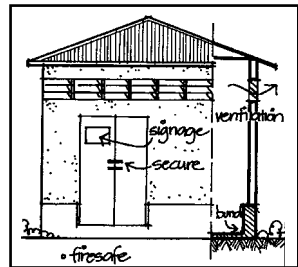
## POLLUTION CONTROL

The objective is to minimise all forms of pollution in the Wet Tropics World Heritage Area.

### Power stations and substations

Generally the storage of environmentally hazardous chemicals shall be prohibited in the Wet Tropics World Heritage Area. However, the Kareeya and Barron River Gorge Power Stations, and Chalumbin substation shall be exempted as maintenance facilities are essential at these locations. In these cases, the following specific procedures regarding the storage and use of chemicals shall apply:

- Minimise the quantities of environmentally hazardous chemicals stored on-site at any time.
- All chemicals (solvents, oils, acids, herbicides) shall be stored in a purpose built structure which is waterproof, secure, well ventilated, fire safe, has a sealed, bunded floor and a ramp or unloading facility.
- Design, internal equipment and signage in accordance with requirements specified on Material Safety Data Sheets (MSDS) of Division of Workplace, Health and Safety.
- Where possible, handling of hazardous chemicals shall take place in a weatherproof, bunded structure provided with a sump and pump-out facility.
- Chemical storage and handling areas are to be secure from public access and have maximum flood protection.
- Drainage systems within the stations shall connect to sumps of a capacity capable of handling the volumes of oil used in machinery in the stations. The sumps shall be fitted with oil-water separators. Submersible pumps or similar shall be available on-site for sump pump-out.
- All liquid discharge including cooling water and sewage effluent shall be stored in appropriate containment and disposal facilities and should be monitored. Special care shall be taken to ensure that liquid discharge is not deliberately or accidentally discharged into waterways or critical habitats. If any problems are identified, immediately contact the Environmental Coordinator.



- Material Safety Data Sheets (MSDS) for chemicals used and stored on-site shall be held in a place accessible to the works officer.
- The Environmental Coordinator shall develop, in conjunction with site supervisors, contingency plans for dealing with chemical or oil spills or other situations which threaten the environment (ie equipment failure). Know the plans relevant for your work area.
- Training shall be provided regularly in the safe use, disposal and correct clean up procedures for environmentally hazardous chemicals (oils, solvents, acids, alkali's, detergents) held on-site.
- Contractors working on-site shall be made aware of pollution control procedures in place.

### **Machinery maintenance**

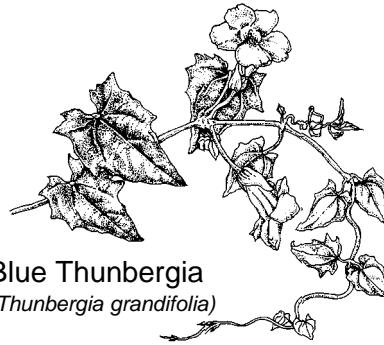
- Should not be undertaken in the World Heritage Area except under emergency circumstances. The highest standards should apply.

## **TEMPORARY QESI CAMPS**

- QESI work camps, including those involving contractors, should be avoided wherever possible within the World Heritage Area.
- Where camps are necessary, temporary toilets should be of an enclosed chemical type and not located within 30 metres of a watercourse. Effluent from these should be removed outside the Wet Tropics World Heritage Area and disposed of at the nearest local authority sewerage treatment works.
- All food waste, rubbish, debris, surplus and waste materials shall be enclosed in sealed containers and kept clear of the camp site at all times. The capacity of these containers shall not be exceeded. The containers should be emptied (outside of the Area) at least weekly and removed from the World Heritage Area at the completion of works.
- The camp shall be left in a clean and tidy state at all times.
- Open fire places are not permitted.
- All native flora and fauna is protected.  
**Do not feed or unduly disturb fauna.**



## APPENDIX 1: WEEDS OF THE WET TROPICS



Blue Thunbergia  
(*Thunbergia grandifolia*)



Brillantaisia (*Brillantaisia lamium*)



Giant Rats Tail Grass  
(*Sporobolus pyramidalis/natalensis*)



Hurangana  
(*Hurangana madagascarencisis*)



Japanese Sunflower (*Lonicerajaponica*)



Miconia (*Miconiasp*)



"Mother of Millions" (*Bryopylliumsp*)



Mikania (*Mikania sp*)



Pond Apple (*Annona glabra*)



Siam Weed (*Chromolaena odorata*)



Sicklepod (*Senna sp*)



Turbina (*Turbina corymbosa*)

## ACKNOWLEDGEMENTS

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Bama Wabu

Environmental Protection Agency (EPA)  
Dept of Natural Resources (DNR)

Weed photos from various sources including WTMA and DNR.