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Glossary

**ACDC Act**  Queensland *Agricultural Chemicals Distribution Control Act 1966*

**ANZECC**  Australian and New Zealand Environment and Conservation Council

**APAS**  Australian Pest Animal Strategy

**AQIS**  Australian Quarantine Inspection Service

**AWS**  Australian Weeds Strategy

**DAFF**  Department of Agriculture, Fisheries and Forestry

**DEEDI**  Department of Employment, Economic Development and Innovation

**DEWHA**  Department of the Environment, Water, Heritage and the Arts

**DPI&F**  Department of Primary Industries and Fisheries

**EMP**  Environmental Management Plan

**EPBC Act**  Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

**IMO**  International Maritime Organisation

**LNG**  Liquefied Natural Gas

**LP(P&SRM)A**  Queensland *Land Protection (Pest and Stock Route Management) Act 2002*

**MSDS**  Material Safety Data Sheet

**National System**  National System for the Prevention and Management of Marine Pests Incursions

**NIMPCG**  National Introduced Marine Pests Coordination Group

**NIMPIS**  National Introduced Marine Pests Information System

**ROV**  Remote Operated Vehicle

**WONS**  Weeds of National Significance

**SEWPaC**  Department of Sustainability, Environment, Water, Population and Communities
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1. Introduction

1.1 Scope

This Biosecurity Management Plan (hereafter BMP) has been prepared in support of the development of the liquefied natural gas (LNG) facility as part of the Australia Pacific LNG Project in full compliance with Condition 46 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) approval EPBC 2009/4977. The EPBC Act approval states:

"Before the commencement of construction of the LNG plant and ancillary onshore facilities, the proponent must prepare a Quarantine Management Plan (QMP). The objectives of the QMP are to prevent the introduction of non-endemic species on to Curtis Island. The QMP must include measures to:

   a) Detect pests and weeds, and prevent weed introduction and/or proliferation;
   b) Control and, unless otherwise determined by the relevant State authorities, eradicate detected non-indigenous terrestrial species (including weeds);
   c) Mitigate adverse impacts of any control and eradication actions on indigenous species taken against detected pests and weeds;
   d) Assess risk, manage supply chains, and manage and inspect vessels;
   e) Mitigate any pest or weed impacts;
   f) Report and record any quarantine incidents;
   g) Identify performance standards to be achieved by the QMP; and
   h) Undertake a review of the QMP and identify the need for any further studies."

This BMP is equivalent to a QMP and describes the current extent and distribution of significant weed and animal pest species on the LNG facility site at Curtis Island, and assesses the potential for pest species and diseases to be introduced to the project area and beyond as a result of the construction and operations of the LNG facility. Information gathered for this assessment has been used to develop strategies to assist management of the potential impacts associated with pest and diseases. This BMP has been developed to consider the LNG facility site as well as areas directly affected by the development of the LNG facility site such as Laird Point and the site access track linking the LNG facility and Laird Point, and an area of 200 metres outside the perimeter of the proposed LNG facility on Curtis Island.

Australia Pacific LNG has identified the need to effectively manage potential impacts associated with pests, weeds and diseases for the construction and operation of the LNG facility on Curtis Island.

Australia Pacific LNG seeks to undertake custodial management of the proposed LNG facility site and surrounding lands in accordance with best-practice management protocols and guidelines as designated by State and Commonwealth government authorities. Procedures for weed and pest animal control and mitigation on land managed by APLNG on Curtis Island will align with best practice management for each species as provided by the Queensland Government Department of Employment, Economic Development and Innovation (DEEDI), the Commonwealth Government Department of Sustainability, Environment,
Water, Population and Communities (SEWPaC) and other agencies, and in accordance with Codes of Practice and Standard Operating Procedures available for each pest and weed species.

### 1.2 Site description

The Australia Pacific LNG Project (the Project) is located near Laird Point and within the Curtis Island Industry Precinct of the Gladstone State Development Area, Curtis Island. The proposed project area lies on land within Lot 3 on SP228454 and within reclamation lease Lot 3 on SP235971 and extends seaward towards North Passage Island. It is located entirely within the south east Queensland bioregion. The Project will involve the construction and operation of an LNG facility and associated infrastructure.

**1.2.1 Existing land use**

Lot 3 on SP228454 is freehold land (owned by Australia Pacific LNG) and forms part of the Gladstone State Development Area. The predominant former land use of the LNG facility site and adjacent properties on Curtis Island was agricultural, with the land being used for cattle grazing. In line with the industrial designation of the Curtis Island Industry Precinct, the agricultural land use on the site has ceased.

The LNG facility site lies within the Great Barrier Reef World Heritage Area and the intertidal area in the central and western portions of the site form part of the Port Curtis wetland area. The Port Curtis wetland area is listed in the Directory of Important Wetlands (Blackman et. al. 1999) and is recognised for its diverse, structured mangrove communities, seagrass populations and importance as wader bird habitat. This area also contains marine plant populations afforded protection under the Queensland *Fisheries Act 1994*.

There is no National Park, Conservation Park, State Forest, Timber Reserve, nature refuge, critical habitat area or RAMSAR-listed wetland within the LNG facility site. However, several protected areas exist in the immediate vicinity, including the Great Barrier Reef Coast Marine Park (Queensland Marine Park), Curtis Island National Park, South End Conservation Park, Garden Island Conservation Park, Cape Capricorn Conservation Park, the Curtis Island Conservation Park, the Curtis Island Nature Refuge and the Curtis Island State Forest. The Curtis Island National Park, located 7.5km to the north east of the LNG facility site, contains a variety of vegetation types, including heath, grassland, low melaleuca woodland, open eucalypt forest and large areas of dry rainforest.

The Curtis Island Environmental Management Precinct borders the Curtis Island Industry Precinct to the east. This area has been set aside by the Queensland Government for protection and rehabilitation, with management focussing on maintaining the existing values and enhancing these through active weed and feral pest control (Department of Infrastructure and Planning, 2010).
1.2.2 **Interim site access via Laird Point**

Interim access for equipment, material and personnel to the LNG facility site will be required while marine facilities on Curtis Island are being constructed. Initial access to the LNG facility site will occur from the adjacent property at Laird Point and will utilise an existing access track which extends from the esplanade (and boat access point) at Laird Point through to the LNG facility site. The duration of use for this track is contingent upon the timing of dredging and construction dock works.

1.3 **Key outcomes**

This BMP, developed to comply with requirements of Condition 46 and 47 of the EPBC Act approval (EPBC2009/4977), identifies biosecurity risks and provides mitigation and management actions associated with the construction and operation of the LNG facility on Curtis Island, including risk associated with weeds, pests and diseases. This plan seeks to ensure that appropriate controls and procedures are implemented, in accordance with regulatory requirements, to avoid or manage the potential impact to Curtis Island, the World Heritage values of the adjacent Great Barrier Reef, the greater Gladstone region and Queensland and Australia’s biosecurity.

This BMP is structured to provide a Weed and Plant Disease Management Strategy, a Terrestrial Pest Animal and Animal Disease Management Strategy and a Marine Pest Management Strategy. The details of this plan will be reviewed in alignment with any review of the Construction Environmental Management Plan (CEMP) and changes to this document subsequent to its approval would be submitted to the Commonwealth Government Minister for the Environment for approval as required by Condition 65 of the EPBC Act approval (EPBC 2009/4977). This plan may be amended at any time following review of changes and approval by the Minister.
2. Weed and plant disease management strategy

2.1 Purpose and objectives

The weed and plant disease management strategy within this BMP is structured to comply with legislative requirements with respect weed and plant disease management on and adjacent to the proposed LNG facility on Curtis Island and in accordance with Condition 46 of approval EPBC 2009/4977. The weed and plant disease management strategy seeks to:

- Provide an assessment of the current extent and distribution of significant weed species within the LNG facility site.
- Develop a management approach for weeds and plant disease, incorporating actions for the prevention of spread of weeds and plant disease, the treatment and control of weeds and plant diseases and the monitoring and reporting of weed and plant disease status.
- Prevent the introduction and/or spread of significant weed species and plant diseases into areas presently unaffected within the LNG facility site and on surrounding land.
- Contain and control identified priority weed infestations.
- Monitor the effectiveness of weed and plant disease prevention and containment strategies to reduce the introduction and/or spread of significant weed species and plant diseases within the LNG facility site and the region.

This strategy focuses on protecting the World Heritage area and other conservation areas surrounding the proposed Australia Pacific LNG facility by reducing the potential for Project activities (particularly the movement of project personnel, equipment and materials to and from the LNG facility site) to introduce and/or spread existing or new significant weed species and plant diseases. The strategy builds on current knowledge of weed species within the Project area and identified threats within the wider region. The development and implementation of the strategy is part of Australia Pacific LNG’s active role to minimise and mitigate impacts on the natural environment and the productivity of surrounding land.

2.2 Legislative requirements

2.2.1 Weed species

The Australian Weeds Strategy (AWS) identifies priorities for weed management within Australia, with the aim of minimising the impact of weeds on environmental, economic and social assets. To achieve this, a list of nationally-agreed priority plant species (Weeds of National Significance [WONS]) for control and management has been established based on rankings of weed species invasiveness, potential to spread and impact to socio-economic and environmental assets.

The Queensland Land Protection (Pest and Stock Route Management) Act 2002 (LP[P&SRM]A) identifies target weed species within Queensland that have, or may potentially have, serious economic, environmental or social impact. Declared plants are classified into three management priorities, based on their current extent and potential to spread:
• Class 1 plants are species that are not commonly present in Queensland and, if introduced, would cause an adverse economic, environmental or social impact. Current infestations in Queensland are subject to eradication from the state and landowners must take reasonable steps to keep their land free of these species.

• Class 2 plants are species that are established in Queensland and have, or could have an adverse economic, environmental or social impact. Landowners must take reasonable steps to keep their land free of Class 2 plants.

• Class 3 plants are established in Queensland and have, or could potentially have, an economic, environmental or social impact. The primary objective of this listing is to prevent the sale and therefore spread of these pests into new areas. Landholders are not required to control these species unless their land is adjacent to an environmentally significant area e.g.:
  − Land dedicated as a reserve for environmental purposes under the Queensland *Land Act 1994*.
  − A World Heritage area listed under the World Heritage Convention.
  − An area supporting a critically endangered ecological community in the list established under the Commonwealth *EPBC Act*.
  − A declared Ramsar wetland under the EPBC Act.
  − An area of high nature conservation value under the Queensland *Vegetation Management Act 1999*.
  − A protected area, other than state-controlled land, identified in a local government’s pest management plan as an area that has special environmental significance for native wildlife.

Australia Pacific LNG is therefore required to manage Class 1, 2 and 3 plants on the proposed Project site. The LP(P&SRM)A regulates the supply of declared weeds and pest animals, the supply of things containing reproductive material of particular declared pest plants and the movement of vehicles or other things on a road if the person knows, or ought reasonably to know, soil or other organic material in or on the vehicle or thing is likely to contain the reproductive material of a declared pest plant.

### 2.2.2 Plant diseases

Australian quarantine regulations apply to all plant and plant products entering Australia. Australian Quarantine Inspection Service (AQIS) administers various Acts, such as the *Quarantine Act 1908*, *Imported Food Control Act 1992* and subsequent legislation in order to minimise the risk of exotic pests and diseases from entering the country and to protect Australia’s plant health status. All products and materials imported into Australia require AQIS inspection and clearance.

DEEDI identifies significant plant pests and diseases that are of concern to Queensland’s agricultural industry, environment and economy. Depending on their current extent and distribution, listed species are classified into two management priorities:

• Exotic pests: Exotic plant, pests and diseases are either not present in Australia, or are present but not established and are under an official containment and/or eradication program.
Emerging pests: Emerging plant, pests and diseases are present in Queensland but their presence is being monitored.

In addition to this classification, plant diseases are further highlighted if they are considered ‘notifiable’ under Queensland’s Plant Protection Regulation 2002. Notifiable pests are considered of such concern that there is a legal requirement to report sightings to DEEDI. Plant diseases and pathogens that may occur on site are listed in Appendix 2.

2.3 Target species

Target weed species for this weed and plant disease management strategy include all species listed under the AWS and/or LP(P&SRM)A with distribution ranges within, or have the potential to spread to within, the LNG facility site. Additional priority species have been identified within regional pest management strategies (Capricorn Pest Management Group, 2004 and Fitzroy Basin Association, 2004) and through AQIS, which includes species not declared by the Queensland Government.

Weeds of national significance, declared plants of Queensland and high priority regional weed species along with AQIS-targeted species are considered significant weed species. All other non-native species are considered environmental weed species.

For the purposes of this strategy, targeted species have been classified into two quarantine management priorities: Priority and Alert Species. Priority Species are those with the greatest potential to impact upon the LNG facility site and surrounding lands based on the species’ current extent and distribution at the site. Management efforts will be specifically targeted at Priority Species to reduce the spread of weeds at the LNG facility site and to surrounding land. Alert Species are those species which are uncommon or that do not currently occur in Queensland but have been recognised as having the potential to occur and impact upon the LNG facility site and the central Queensland region based on known and potential distributional ranges and habitat preferences. This may include species that are not currently present in Australia, or that are present but not established. Alert species are unlikely to be encountered at the LNG facility site but should be recognised for their potential invasiveness and potential to impact the environment, primary production and the economy.

2.3.1 Weed species

Target weed species are listed in Table 2.1 with detailed descriptions of each species’ biology, ecology, distribution and potential impact provided in Appendix 1. Dispersal vectors and management actions for weeds are described in Table 2.2.

Table 2.1 Target weed species of the LNG facility study area

<table>
<thead>
<tr>
<th>Weed species</th>
<th>Status*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common lantana (Lantana camara)</td>
<td>WONS 3</td>
</tr>
<tr>
<td>Common prickly pear (Opuntia stricta)</td>
<td>- 2</td>
</tr>
<tr>
<td>Rubber vine (Cryptostegia grandiflora)</td>
<td>WONS 2</td>
</tr>
</tbody>
</table>
### Weed species

<table>
<thead>
<tr>
<th>Weed species</th>
<th>Status*</th>
</tr>
</thead>
<tbody>
<tr>
<td>balloon cotton (<em>Gomphocarpus physocarpus</em>)</td>
<td>CTH: -  Qld: ND</td>
</tr>
<tr>
<td>flannel weed (<em>Sida cordifolia</em>)</td>
<td>CTH: -  Qld: ND</td>
</tr>
<tr>
<td><strong>Alert Species</strong></td>
<td></td>
</tr>
<tr>
<td>acacia spp. other than <em>A. nilotica</em> and <em>A. Farnesiana</em></td>
<td>CTH: -  Qld: 1</td>
</tr>
<tr>
<td>alligator weed (<em>Alternanthera philoxeroides</em>)</td>
<td>CTH: -  Qld: WONS 1</td>
</tr>
<tr>
<td>American rat’s tail grass (<em>Sporobolus indicus</em> var. <em>pyramidalis</em> syn. <em>S. jacquemonti</em>, <em>S. pyramidalis</em>)***</td>
<td>CTH: -  Qld: 2</td>
</tr>
<tr>
<td>anchored water hyacinth (<em>Eichhornia azurea</em>)</td>
<td>CTH: -  Qld: 1</td>
</tr>
<tr>
<td>annual thunbergia (<em>Thunbergia annua</em>)</td>
<td>CTH: -  Qld: 1</td>
</tr>
<tr>
<td>badhara bush (<em>Gmelina elliptica</em>)***</td>
<td>CTH: -  Qld: 1</td>
</tr>
<tr>
<td>bellyache bush (<em>Jatropha gossypifolia</em>)***</td>
<td>CTH: -  Qld: 2</td>
</tr>
<tr>
<td>bitou bush (<em>Chrysanthemoides monilifera</em> subsp. <em>rotundata</em>)</td>
<td>CTH: -  Qld: WONS 1</td>
</tr>
<tr>
<td>blue heliotrope (<em>Heliotropium amplexicaule</em>)</td>
<td>CTH: -  Qld: ND</td>
</tr>
<tr>
<td>bridal creeper (<em>Asparagus asparagoides</em>)</td>
<td>CTH: -  Qld: WONS 1</td>
</tr>
<tr>
<td>broad-leaved pepper tree (<em>Schinus terebinthifolius</em>)***</td>
<td>CTH: -  Qld: 3</td>
</tr>
<tr>
<td>buffel grass(<em>Pennisetum ciliare</em>)***</td>
<td>CTH: -  Qld: ND</td>
</tr>
<tr>
<td>candleberry myrth (<em>Myrica faya</em>)</td>
<td>CTH: -  Qld: 1</td>
</tr>
<tr>
<td>castor oil plant (<em>Ricinus communis</em>)***</td>
<td>CTH: -  Qld: ND</td>
</tr>
<tr>
<td>cat’s claw creeper (<em>Macfadyena unguis-cati</em>)***</td>
<td>CTH: -  Qld: 3</td>
</tr>
<tr>
<td>Chilean needle grass (<em>Nassella neesiana</em>)</td>
<td>CTH: -  Qld: WONS 1</td>
</tr>
<tr>
<td>chinee apple (<em>Ziziphus mauritiana</em>)***</td>
<td>CTH: -  Qld: 2</td>
</tr>
<tr>
<td>cholla cactus (<em>Cylindropuntia</em> spp. and their hybrids, other than <em>C. spinosior</em>, <em>C. fulgida</em> and <em>C. imbricata</em>)</td>
<td>CTH: -  Qld: 1</td>
</tr>
<tr>
<td>Christ’s thorn (<em>Ziziphus spina-christi</em>)</td>
<td>CTH: -  Qld: 1</td>
</tr>
<tr>
<td>creeping lantana (<em>Lantana montevidensis</em>)***</td>
<td>CTH: -  Qld: 3</td>
</tr>
<tr>
<td>easter cassia (<em>Senna pendula</em> var. <em>glabrata</em>)***</td>
<td>CTH: -  Qld: ND</td>
</tr>
<tr>
<td>erect tar vine (<em>Boerhavia erecta</em>)**</td>
<td>CTH: -  Qld: ND</td>
</tr>
<tr>
<td>Eurasian milfoil (<em>Myriophyllum spicatum</em>)</td>
<td>CTH: -  Qld: 1</td>
</tr>
<tr>
<td>Weed species</td>
<td>Status*</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>fanwort (Cabomba spp. other than C. caroliniana)</td>
<td>CTH</td>
</tr>
<tr>
<td>floating chestnut (Trapa spp.)</td>
<td>Qld</td>
</tr>
<tr>
<td>fragrant thunbergia (Thunbergia fragrans)</td>
<td></td>
</tr>
<tr>
<td>giant rats tail grass (Sporobolus natalensis)**</td>
<td></td>
</tr>
<tr>
<td>giant sensitive plant (Mimosa invisa)**</td>
<td></td>
</tr>
<tr>
<td>glush weed (Hygrophila costata)</td>
<td></td>
</tr>
<tr>
<td>gorse (Ullex europaeus)</td>
<td></td>
</tr>
<tr>
<td>Groundsel (Baccharis halimifolia)***</td>
<td></td>
</tr>
<tr>
<td>harissia cactus (Eriocereus martini)***</td>
<td></td>
</tr>
<tr>
<td>hawkweed (Hieracium spp.)*</td>
<td></td>
</tr>
<tr>
<td>honey locust (Gleditsia spp.)</td>
<td></td>
</tr>
<tr>
<td>horsetails (Equisetum spp.)</td>
<td></td>
</tr>
<tr>
<td>hymenachne (Hymenachne amplexicaulis)***</td>
<td></td>
</tr>
<tr>
<td>kochia (Kochia scoparia syn. Bassia scoparia)</td>
<td></td>
</tr>
<tr>
<td>Koster’s curse (Clidermia hirta)</td>
<td></td>
</tr>
<tr>
<td>lagarosiphon (Lagarosiphon major)</td>
<td></td>
</tr>
<tr>
<td>laurel clockvine (Thunbergia laurifolia)</td>
<td></td>
</tr>
<tr>
<td>leuceana (Leuceana leucocephala)***</td>
<td></td>
</tr>
<tr>
<td>limnocharis (Limnocharis flava)</td>
<td></td>
</tr>
<tr>
<td>lippia (Phyla canescens)***</td>
<td></td>
</tr>
<tr>
<td>maderia vine (Anredera cordifolia)***</td>
<td></td>
</tr>
<tr>
<td>madras thorn (Pithecellobium dulce)</td>
<td></td>
</tr>
<tr>
<td>Mexican bean tree (Cecropia spp.)</td>
<td></td>
</tr>
<tr>
<td>Mexican feather grass (Nassella tenuissima)</td>
<td></td>
</tr>
<tr>
<td>mikania vine (Mikania micrantha)</td>
<td></td>
</tr>
<tr>
<td>mimosa bush (Acacia farnesiana)***</td>
<td></td>
</tr>
<tr>
<td>Weed species</td>
<td>Status*</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>mimosa pigra (<em>Mimosa pigra</em>)***</td>
<td>WONS 1</td>
</tr>
<tr>
<td>minconia (<em>Miconia calvescens</em>)</td>
<td>- 1</td>
</tr>
<tr>
<td>mother of millions (<em>Bryophyllum tubiflorum</em>)***</td>
<td>- 2</td>
</tr>
<tr>
<td>noogoora burr (<em>Xanthium occidentale</em>)***</td>
<td>- ND</td>
</tr>
<tr>
<td>paramatta grass (<em>Sporobolus africanus</em>)***</td>
<td>- 2</td>
</tr>
<tr>
<td>parkinsonia (<em>Parkinsonia aculeata</em>)***</td>
<td>WONS 2</td>
</tr>
<tr>
<td>parthenium weed (<em>Parthenium hysterophorus</em>)***</td>
<td>WONS 2</td>
</tr>
<tr>
<td>Peruvian primrose (<em>Ludwigia peruviana</em>)</td>
<td>- 1</td>
</tr>
<tr>
<td>prickly acacia (<em>Acacia nilotica subsp. indica</em>)*</td>
<td>WONS 2</td>
</tr>
<tr>
<td>red sesbania (<em>Sesbania punicea</em>)</td>
<td>- 1</td>
</tr>
<tr>
<td>saffron thistle (<em>Carthamus lanatus</em>)***</td>
<td>- ND</td>
</tr>
<tr>
<td>salvinia (<em>Salvinia molesta</em>)***</td>
<td>WONS 2</td>
</tr>
<tr>
<td>salvinia (<em>Salvinia spp. other than S. molesta)</em></td>
<td>- 1</td>
</tr>
<tr>
<td>senegal tea plant (<em>Gymnocoronis spilanthoides</em>)</td>
<td>- 1</td>
</tr>
<tr>
<td>serrated tussock (<em>Nassella trichotoma</em>)</td>
<td>WONS 1</td>
</tr>
<tr>
<td>siam weed (<em>Chromolaena odorata</em>)</td>
<td>- 1</td>
</tr>
<tr>
<td>Singapore daisy (<em>Sphagnetricola trilobata</em>)***</td>
<td>- 3</td>
</tr>
<tr>
<td>sisal hemp (<em>Agave sisalana</em>)***</td>
<td>- ND</td>
</tr>
<tr>
<td>spiked pepper (<em>Piper aduncum</em>)**</td>
<td>- ND</td>
</tr>
<tr>
<td>thornapple (<em>Datura stramonium</em>)***</td>
<td>- ND</td>
</tr>
<tr>
<td>velvet tree pear (<em>Opuntia tomentosa</em>)***</td>
<td>- 2</td>
</tr>
<tr>
<td>water hyacinth (<em>Eichornia crassipes</em>)***</td>
<td>- 2</td>
</tr>
<tr>
<td>water lettuce (<em>Pistia stratoites</em>)***</td>
<td>- 2</td>
</tr>
<tr>
<td>water mimosa (<em>Neptunia oleracea and N. plena</em>)</td>
<td>- 1</td>
</tr>
<tr>
<td>witch weeds (<em>Striga spp. other than native species</em>)**</td>
<td>- 1</td>
</tr>
<tr>
<td>yellow oleander (<em>Casabela thevetia</em>)***</td>
<td>- 3</td>
</tr>
</tbody>
</table>
2.4 Management area

2.4.1 Site assessment

An initial weed assessment was undertaken by a qualified botanist in April 2009 to identify the current extent and distribution of significant weed species on the LNG facility site. The assessment focussed on the LNG facility site as it is expected that the greatest concentration of activity will occur here. Given that vehicle movement has been identified as a significant potential contributor to the introduction and/or spread of weed species, particular focus was given to the main site access route. An existing site access track from Laird Point to the LNG facility site has been identified as an interim access route for personnel, equipment and materials, while the construction marine facilities are being constructed. The LNG facility site, associated marine berths and the Laird Point access track are collectively known as the Targeted Weed and Plant Disease Management Area (Figure 2.1) and will be the focus of control and monitoring efforts associated with the Project. Although not included in the Targeted Weed and Plant Disease Management Area, it is expected that associated mainland facilities will be managed under similar arrangements.

The control measures and their effectiveness for management of weed species on the proposed LNG facility site will be reviewed in light of ongoing weed surveys during the operational life of the LNG facility, in alignment with changes to best practice management and in consultation with relevant Government agencies including DEEDI and AQIS.

There is potential for weeds and plant diseases to be introduced by marine transportation associated with the export of LNG to international markets and delivery to site of equipment and machinery sourced from overseas. If new weed species are identified as a result of this marine transportation activity within the Port of Gladstone, Australia Pacific LNG will manage these weed species to mitigate impacts and prevent further infestations.

2.4.2 Current distribution of targeted species on site

The extent and distribution of significant weed species in the Targeted Weed and Plant Disease Management Area is relatively low. Two WONS species were identified within this area, including rubber vine and common lantana and one Priority (Class 2) species, prickly pear (Figure 2.2). Prickly pear was the most prevalent significant weed species observed throughout the Targeted Weed and Plant Disease Management Area, with the largest infestations recorded along the western boundary of the island around the marine fringes. All other species were recorded in small isolated infestations in the north western portion of the site.
2.4.3 Major weed infestations currently on site

Six major infestations of significant weed species were identified during the initial weed assessment work, predominantly occurring in the western portion of the LNG facility site along the marine fringes (Figure 2.2). These infestations are recognised as requiring careful management based on population size, growth stage and potential to spread to other areas within the LNG facility site and to surrounding lands and protected areas (e.g. the Environmental Management Precinct). These infestations will form the focus of weed management efforts, particularly during vegetation clearing work for site preparation, due to the potential for weed and seed spread through the disturbance of soil and vegetative materials. These areas have been designated as Weed Control Sites. All other areas within the LNG facility site and the interim site access route are considered Weed Monitoring Areas.

Weed species not considered significant were also recorded during the survey and include balloon cotton (Gomphocarpus physocarpus) and flannel weed (Sida cordifolia). Although not declared weeds, these species are considered environmental weeds with the potential to alter both vegetation structure and composition of native plant communities. These species were recorded in small infestations within the Targeted Weed and Plant Disease Management Area, generally in association with Queensland’s blue gum (Eucalyptus tereticornis) and narrow-leaved red ironbark (E. crebra) communities.
Figure 2.1 - Targeted Weed and Plant Disease Management Area

Source Information
Source imagery
Captured by GeoEye-1 on 24 March 2009
LNG facility site boundary and Seabed Lease area
Extracted from translated file publicsiteplan_20_07_10.dgn supplied by client 16/08/2010.
LNG facility development footprint
Tracks Determined by WorleyParsons September 2009

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BIOSECURITY MANAGEMENT PLAN

LEGEND

- Laird Point track
- Proposed development
- LNG facility site boundary
- LNG facility development footprint

K:\CONOCOPHILLIPS\10100101\GIS\Maps\00752-00-EN-DAL-3082-B(BMP_Mgt_Area).wor
Figure 2.2 - Known Major Weed Infestations on Site

Source Information
Source imagery
Captured by GeoEye-1 on 24 March 2009
LNG facility site boundary and Seabed Lease area
Extracted from translated file publicsiteplan_20_07_10.dgn supplied by client 16/08/2010.
LNG facility development footprint
Weed locations
Sourced from field survey conducted by WorleyParsons October 2009.

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LEGEND
Significant weed species
- Rubber vine
- Lantana
- Prickly pear
Proposed development
- LNG facility site boundary
- LNG facility development footprint

AUSTRALIA PACIFIC LNG PROJECT
BIOSECURITY MANAGEMENT PLAN

K:\CONOCOPHILLIPS\301001-00752\GIS\Maps\00752-00-EN-DAL-3084-B(BMP_Weeds).wor
2.5 Weed management strategy

2.5.1 Prevention

Prevention is the most effective way to manage weeds by minimising the introduction of new weed species and/or plant disease and spread of existing weed species within the LNG facility site. When weeds are detected they will be reported using a standardised Incident Reporting Form to be formally issued for use by Australia Pacific LNG. For the purposes of this strategy and in the interim, the reporting form for weeds provided at Appendix 9 will be used. All weed detection incidents are to be reported using this form.

Measures to prevent the introduction and/or spread of significant weed species and plant diseases within the LNG facility site and to the surrounding land are summarised below:

- Ensure vehicles, machinery and plant equipment are washed prior to arriving at Laird Point at an approved and appropriately located washdown facility. Appendix 4 provides a reporting form and guidelines on the vehicle washdown procedure, and is also available online: http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Weed_Hygiene-Declaration.pdf

- Vehicle and plant equipment that has undertaken activities in confirmed infestation areas on Curtis Island will be washed down upon exiting the LNG facility site at a dedicated onsite washdown location to remove all soil and vegetative material from cabins, trays and under carriages, particularly where that vehicle/equipment. Known weed infested areas are identified in Section 2.4.2.

- All contractors working within the LNG facility site will be made aware of the significant weed species of the region and their potential impact on the LNG facility site and surrounding lands. Construction contractors will be made aware of their responsibilities to manage their activities so as to minimise the introduction and/or spread of these species on site and to surrounding land (including the mainland).

- Vehicles, machinery, plant equipment and materials imported from overseas will be inspected by quarantine and customs in accordance with the requirements and protocols of AQIS. If applicable, a quarantine/bonded area on Curtis Island will be established for staging and technical inspection prior to the release of vehicles, equipment and materials on site to facilitate AQIS inspections. In the event that materials or equipment imported from overseas are off-loaded at other areas within the Port of Gladstone, Australia Pacific LNG will work with AQIS to ensure that appropriate quarantine inspection processes occur.

- During site clearing operations in areas of known significant weed infestations, vegetation materials will be disposed of at a designated disposal site or otherwise appropriately managed to avoid weed seed spread to other areas of the LNG facility site and surrounding lands.
Activities within the LNG facility site in known weed infestation areas will be restricted where possible (Section 2.4.2). Where activities are proposed in a known weed infested area, activities will be restricted to periods where the significant weed species present are not flowering or fruiting to prevent weed spread. Flowering and fruiting times of significant weed species are summarised in Appendix 1.
Table 2.2 Dispersal vectors for weed plants relevant to species occurring on the proposed APNLG facility at Curtis Island

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>Wind Dispersal</td>
<td>High</td>
<td>Rubber Vine ((Cryptostegia grandiflora))</td>
<td>The dispersal of weed species by wind is difficult to mitigate. All staff will be educated in weed identification during their site induction. Inspection for weed infestations</td>
<td>All outbreaks of wind dispersed species on site will be hand removed and appropriately disposed of or spot sprayed with herbicide.</td>
<td>Dedicated weed surveys will be conducted every 3 months during the high risk construction stage (first 2 years) and 6 monthly after that.</td>
<td>A detailed population assessment of declared weeds was completed March 2011 Further assessment will be conducted by qualified ecologists during the dedicated weed surveys. It is a performance requirement that weed species abundance and population density be reduced during construction and operation.</td>
</tr>
<tr>
<td></td>
<td>Water Dispersal</td>
<td>High</td>
<td>Cat's Claw Creeper ((Macfadyena)</td>
<td>It is not anticipated that weeds will be introduced from the small freshwater systems on site</td>
<td>All outbreaks of water dispersed species on site will be hand removed and</td>
<td>Dedicated weed surveys will be conducted every 3 months during the high</td>
<td>A detailed population assessment of declared weeds was</td>
</tr>
</tbody>
</table>
### Weed plants

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Unguis-cati (Parthenium hysterophorus)</td>
<td>Moderate</td>
<td>Potentially All Species</td>
<td>Construction materials will be sourced from the Australia Pacific LNG site where possible. Where construction materials are not able to be sourced from site. The weeds existing on the Australia Pacific LNG site are in highest densities in the areas adjacent to the intertidal zone in the western sections of site.</td>
<td>Appropriate disposal or spot sprayed with herbicide.</td>
<td>Risk construction stage and 6 monthly after that.</td>
<td>Completed March 2011.</td>
</tr>
</tbody>
</table>

Weed surveys will focus on the land adjacent to the tidal areas in the west of the site. All staff will be educated in weeds identification during their site induction.

A detailed population assessment of declared weeds was completed March 2011.
### Weed plants

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</tr>
</thead>
<tbody>
<tr>
<td>Fauna Dispersal – (attached to fur, deposited in scats)</td>
<td>Moderate</td>
<td>Noogoora Burr (<em>Xanthium occidentale</em>)</td>
<td>site they will be inspected for weed presence or obtained from weed-free sources.</td>
<td>site will be hand removed and appropriately disposed of or spot sprayed with herbicide.</td>
<td>on areas where imported construction materials were used</td>
<td>Dedicated weed surveys will be conducted every 3 months during the high risk construction stage and 6 months after that.</td>
<td>A detailed population assessment of declared weeds was completed March 2011.</td>
</tr>
</tbody>
</table>

Noogoora Burr (*Xanthium occidentale*), Lantana (*Lantana camara*), Prickly pear (*Opuntia spp.*)

It is considered that the pest fauna management procedures outlined in this plan are sufficient to control exotic fauna on site and reduce the potential for dispersal of seeds deposited in scats and seeds on fur.

Construction of a boundary fence (as described in this plan) will help minimise seed dispersal of seeds attached to fur of larger mobile fauna species such as Kangaroos and Horses.

Weed species known to be dispersed in avian fauna scats such as Camphor laurel (*Cinnamomum camphora*) will be targeted.

It is a performance requirement that weed species abundance and population density be reduced during construction and
### Weed plants

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<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Anthropogenic dispersal</strong> (equipment and vehicles)</td>
<td>High</td>
<td>Potentially All Species</td>
<td>All Vehicles and Mobile Plant will be inspected by a certified weed washdown inspector prior to being allowed on site. Where possible work on site in infested areas will be conducted separately and clean down will be completed prior to moving to unaffected areas. Slashing and other works will be avoided during peak seed production times. Machinery will be washed down before moving from weed infested work areas into clean work areas. All hand tools and work implements such as shovels</td>
<td>Weeds will be removed from roads, access ways and buffer zones on site and these areas will be inspected ever three months during construction to ensure no transport of weeds within the site.</td>
<td>Dedicated weed surveys will be conducted every 3 months during the high risk construction stage and 6 monthly after that. All staff will be educated in weeds identification during their site induction to aid in weed identification in areas frequently accessed by staff.</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------</td>
<td>---------------------</td>
<td>---------------------</td>
<td>------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Anthropogenic dispersal (persons)</td>
<td>High</td>
<td>Weeds</td>
<td>All inspectors will complete the approved inspection course and receive a satisfactory assessment before inspecting any items. Boots and clothing are to be free of seeds and soil prior to arrival on site.</td>
<td>Weeds will be removed from roads, access ways and buffer zones on site and these areas will be inspected ever three months during construction to ensure no transport of weeds within the site. All personnel will be required to dispose of seeds attached to clothing, boots (and so forth) in sealed plastic bags, which are to be placed in appropriately sealed garbage containers for disposal.</td>
<td>All staff will be educated in weeds identification during their site induction to aid weed identification in areas frequently accessed by staff.</td>
</tr>
</tbody>
</table>
**Weed plants**

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Deliberate introductions and garden dumping</td>
<td>Low</td>
<td>Potentially All Species</td>
<td>No live plant materials are to be taken on site. This includes indoor office plants.</td>
<td>Signage (identifying the Australia Pacific LNG property) will be erected and access to the site will be restricted.</td>
<td>Dedicated weed surveys will be conducted every 3 months during the high risk construction stage and 6 monthly after that. The surveys will include the site boundary fences.</td>
<td>A detailed population assessment of declared weeds was completed March 2011. Further population assessments will be conducted by qualified ecologist during the dedicated weed surveys. It is a performance requirement that weed species abundance and population density be reduced during construction and operation.</td>
</tr>
</tbody>
</table>

The site is located approximately 12 km from the residential areas on the Island. It is considered highly unlikely that plants will be deliberately dumped at the site, given access restrictions.

All staff will be instructed during the induction process that no plant materials are to be bought from the mainland.

A detailed population assessment of declared weeds was completed March 2011.
2.5.2 Treatment and control

Where weeds have become established, treatment applications will be implemented to reduce the potential for these species to spread to new, unaffected areas within the LNG facility site and to surrounding lands. Six priority weed infestations have been identified within the LNG facility site and these will be the focus of treatment application works for the site. Treatment applications will be selected on a species-by-species basis depending on the effectiveness of the application to control each species, the size and growth stage of each infestation and the timing of application. Surrounding land use and weather conditions will be considered when choosing a treatment application.

Treatment applications may employ mechanical, chemical, biological and cultural methods to reduce the size of infestations and minimise the potential to spread to new, unaffected areas. Treatment applications will be documented using the Incident (Weed) Reporting Form (Appendix 5) including the use of photo monitoring to assess the effectiveness of the treatment in reducing weed density.

Physical/Mechanical Control

Physical/mechanical control methods are one of the oldest forms of weed control and can be highly effective for the treatment of small infestations. Physical/mechanical control can be applied with machinery or equipment that is readily available. This type of control is often cost effective and may help to retain ground cover and discourage germination of weed seeds; however, because this method can disturb the soil, its use is often discouraged in areas with poor soil stability.

Physical/mechanical methods may include:

- Hand-pulling
- Grubbing
- Slashing/Mowing
- Cultivation (Ripping/Rotary Hoeing/Stick Raking)
- Bulldozing
- Netting
- Mulching.

Chemical Control

Chemical control may be used where physical/mechanical methods have proven ineffective. All chemical treatment methods will be undertaken by experienced and licensed spray operators in accordance with the Queensland Agricultural Chemicals Distribution Control Act 1966 (ACDC Act). Commercial operator licences are issued by the Queensland Department of Primary Industries and Fisheries (DPI&F). An information sheet and relevant application forms are provided in Appendix 6.

Type and method of application for chemical treatments will vary depending on the targeted species, situation (e.g. proximity to waterways), size of infestation and growth stage of individuals (refer to the Material Safety Data Sheet [MSDS] for individual herbicides). DPI&F can provide details on registered herbicides for the Priority and Alert Species listed in Table 2.1 and Table2.3. Methods of chemical applications include:
• Foliar Spray
• Wick Application
• Basal Bark
• Cut Stump
• Stem Injection
• Soil application
• Root Application.

**Biological Control**

Biological control is the used of species that consume or otherwise harm pest species without causing further damage to other species. Biological control agents are typically host-specific and will only occur where there is an adequate source of weed infestation. Biological controls are most effective when used in conjunction with chemical or mechanical control techniques.

**Cultural Control**

Cultural control refers to land management and focuses on adopting better management practices in order to reduce weed infestations and prevent weed spread. These methods are most effective when used in conjunction with other physical/mechanical, chemical and biological control applications and may include:

- Revegetation
- Quarantine
- Fire
- Hygiene

All vegetation areas to be retained and cleared areas to be revegetated will be identified prior to the commencement of construction. A revegetation plan will be developed for retained and cleared areas that will be rehabilitated.

**Table 2.3 Priority weed species on site and summary control recommendations**

<table>
<thead>
<tr>
<th>Species</th>
<th>Control measure</th>
<th>Timing</th>
<th>Mitigation of reinfestation</th>
</tr>
</thead>
<tbody>
<tr>
<td>lantana (Lantana camara)*</td>
<td>Spray until run-off</td>
<td>Autumn</td>
<td>Follow up spraying on all plants for 4 years to deplete soil seed bank</td>
</tr>
<tr>
<td>prickly pear (Opuntia stricta)*</td>
<td>Biological control followed by herbicide</td>
<td>Annual</td>
<td>Introduction of biological control insects followed by herbicide spraying</td>
</tr>
<tr>
<td>rubber vine (Cryptostegia grandiflora)*</td>
<td>Burning, biological agents and herbicide</td>
<td>Annual</td>
<td>Continual follow-up of herbicide as plants are discovered</td>
</tr>
<tr>
<td>balloon cotton</td>
<td>herbicide (Glyphosate)</td>
<td>Spring</td>
<td>Follow-up herbicide when plants are discovered</td>
</tr>
</tbody>
</table>
For each of the three Declared Priority Weed species in Table 2.3 above, the best practice management guidelines and appropriate herbicide treatments are detailed by DPI&F. Links to this information are provided below (DPI&F does not presently have information available specific to the two non-declared weed species listed in Table 2.3 above).

- Lantana:  

- Prickly pear:  

- Rubber vine:  

### 2.5.3 Monitoring and reporting

Monitoring is an integral part of the weed management strategy and establishes benchmarks for assessing the extent and distribution of significant weed species within the LNG facility site over time and the effectiveness of management strategies including treatment to minimise the introduction and/or spread of these species and diseases. Reporting of weeds on site will be done using a standardised Incident Reporting Form (Appendix 1).

As a result of gathering information through the monitoring process, the management strategy can be altered as needed to improve effectiveness and to respond to changes in the environment, thereby giving the strategy resilience and flexibility to react to seasonal conditions and to changes that may compromise existing priorities and previously set goals. The approval of the Commonwealth Minister for the Environment would be sought prior to implementation of changes to this strategy, per condition 65 of the EPBC Act approval.

Monitoring activities will focus on:

- Extent and distribution of weed populations including new infestations. A rapid weed survey by a qualified botanist (Section 2.4.1), will be undertaken every three months during construction activities. Following construction, rapid weed surveys will be undertaken on a three-monthly basis for two years then annually to assess the extent and distribution of significant weed
species within the LNG facility site and adjacent areas. This survey will include previously disturbed areas, retained vegetation, buffer areas and monitoring for plant disease.

- Treatment applications - Photos will be taken prior to and after treatment applications to provide a visual assessment of the effectiveness of methods to reduce weed density.
- Information gathered during the monitoring process will enable informed management decisions to be made and allow for the alteration and tailoring of the weed management strategy to suit priorities.
- Performance auditing of reduction in weed diversity and abundance on site and on adjacent land can be conducted against baseline weed reporting.

2.6 Plant diseases

No plant diseases were observed on site during field survey efforts. However plant diseases can be dormant and remain undetected, and may also rapidly infest a new area. As such it is necessary to establish awareness of, and provide management strategies for, potential plant diseases on site.

All plant diseases listed in Table 2.4 are considered to be Alert Diseases, as defined in Section 0. These diseases are unlikely to be encountered on the LNG facility site but are recognised for the potential impact to agriculture, existing environmental values and the economy, should the disease be introduced to the project area. Detailed descriptions of the biology, ecology, distribution and potential impact of these pathogens are provided in Appendix 2. As no plant diseases are known to occur on the LNG facility site, none are considered as Priority Diseases.

Table 2.4 Plant diseases potentially occurring within the LNG facility study area

<table>
<thead>
<tr>
<th>Plant diseases</th>
<th>Organism</th>
<th>Status*</th>
<th>AQIS</th>
<th>DEEDI</th>
</tr>
</thead>
<tbody>
<tr>
<td>black sigatoka</td>
<td>fungus</td>
<td>-</td>
<td>exotic**</td>
<td></td>
</tr>
<tr>
<td>branched broomrape</td>
<td>parasitic weed</td>
<td>concern</td>
<td>exotic</td>
<td></td>
</tr>
<tr>
<td>banana bunchy top</td>
<td>virus</td>
<td>-</td>
<td>emerging**</td>
<td></td>
</tr>
<tr>
<td>citrus canker</td>
<td>bacteria</td>
<td>-</td>
<td>exotic**</td>
<td></td>
</tr>
<tr>
<td>citrus greening (Huanglongbing)</td>
<td>bacteria</td>
<td>-</td>
<td>exotic**</td>
<td></td>
</tr>
<tr>
<td>eucalyptus/guava rust</td>
<td>fungus</td>
<td>concern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>grapevine leaf rust</td>
<td>fungus</td>
<td>-</td>
<td>exotic**</td>
<td></td>
</tr>
<tr>
<td>karnal bunt</td>
<td>fungus</td>
<td>concern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mango malformation disease</td>
<td>fungus</td>
<td>-</td>
<td>exotic**</td>
<td></td>
</tr>
<tr>
<td>myrtle rust</td>
<td>fungus</td>
<td>-</td>
<td>exotic</td>
<td></td>
</tr>
<tr>
<td>Panama disease</td>
<td>fungus</td>
<td>-</td>
<td>exotic**</td>
<td></td>
</tr>
</tbody>
</table>
### Plant diseases

<table>
<thead>
<tr>
<th>Plant diseases</th>
<th>Organism</th>
<th>Status*</th>
</tr>
</thead>
<tbody>
<tr>
<td>papaya ringspot</td>
<td>virus</td>
<td>-</td>
</tr>
<tr>
<td>pine pitch canker</td>
<td>fungus</td>
<td>concern</td>
</tr>
<tr>
<td>plum pox</td>
<td>virus</td>
<td>concern</td>
</tr>
<tr>
<td>sugar cane smut</td>
<td>fungus</td>
<td>-</td>
</tr>
<tr>
<td>tomato leaf curl virus</td>
<td>virus</td>
<td>-</td>
</tr>
<tr>
<td>tomato yellow leaf curl virus</td>
<td>virus</td>
<td>-</td>
</tr>
</tbody>
</table>


### 2.6.1 Plant pathogens

Target plant pathogens (those with the potential to occur on site) for this weed and plant disease management strategy include all plant pathogens listed as significant by DEEDI and all additional diseases identified as a management concern by AQIS.

### 2.6.2 Plant disease management strategy

Plants and parts of plants (such as fruit) will be examined before entering the LNG facility site to ensure that plant diseases are not introduced or spread on site and to surrounding lands (including the mainland). Vehicles, machinery, plant equipment and materials imported from overseas will be made available for inspection by quarantine and customs in accordance with the requirements and protocols of AQIS.

If required a quarantine/bonded area on Curtis Island will be established for staging and technical inspection prior to the release of vehicles, equipment and materials on site to facilitate AQIS inspections. In the event that materials or equipment imported from overseas are offloaded at the Fisherman’s Landing northern expansion area (or other areas within the Port of Gladstone), Australia Pacific LNG and the Construction contractors will work with AQIS to ensure that appropriate quarantine inspection processes are facilitated.

Construction contractors and visitors to the LNG facility site will be made aware of plant disease quarantine requirements including how to identify Alert plant diseases and the risks these pose to Australia along with how their actions can contribute to and prevent the introduction and/or spread of these diseases and the penalties that might be incurred as a result of introducing plant diseases to the region.

Where necessary quarantine bins will be provided for the receipt of quarantine waste which may include plants and/or plant materials. This material would be collected and treated or disposed of only by qualified personnel in accordance with AQIS requirements. Contact details for quarantine personnel will be made readily available to site personnel.
Plants and plant materials suspected of being affected by an alert plant disease will be immediately reported to DPI&F so they may provide instruction on further action to be taken such as diagnosis, containment and treatment.

2.7 Action plan for weeds

An action plan for implementation of the weed and plant disease management strategy in the LNG facility site includes the following:

- All contractors/visitors will be made familiar with the significant weed species and potential plant diseases of the LNG facility site and their responsibilities to minimise their introduction and/or spread.

- All weed infestations or suspected weed infestations will be reported using a standardised reporting form. Copies of Incident Reporting Forms to be used for weed reporting (refer Appendix 7) and contact numbers for weed management personnel will be made readily available.

- Implement mandatory vehicle wash-down for vehicles entering Curtis Island. Vehicles entering Curtis Island will be accompanied by a signed Weed Declaration Form indicating that these vehicles are weed-free (refer to Appendix 7).

- Restrict activities in Weed Control Sites where practicable. Where vehicle movement and/or project development activities are proposed to occur within these sites, activities will be scheduled outside the known peak growth period (flowering and fruiting times) of the weed species identified.

- Machinery, plant equipment and materials imported from overseas will be inspected by quarantine personnel in accordance with the requirements and protocols of AQIS.

- Install quarantine disposal bins where necessary for the disposal of quarantine waste which may include plants or plant products suspected of being affected by plant diseases.

- Implement a monitoring plan which includes:
  - Three-monthly rapid weed and plant disease surveys during the first 2 years of construction to assess the extent and distribution of significant weed species in the Weed Monitoring Area. Particular attention will be given to the site access route and the buffer zone between the LNG facility site and the Curtis Island Environmental Management Precinct along with any high traffic areas.
  - Reporting of all weed infestations using a standardised Incident Reporting Form (Appendix 9). These forms will be collated and kept by the Site manager for review and auditing purposes.
  - Four to six weekly monitoring of treated control sites to assess the effectiveness of treatment applications and identify areas requiring additional management.
− Staff and contractors will observe their work area and report all new infestations, particularly *Parthenium* outbreaks as soon as possible so that suitable management can be applied.

− Six monthly progress reports will be prepared to document treatment efforts to control and contain major weed infestations and the effectiveness of the measures in reducing weed populations and eliminating the establishment of new infestations. Information gathered from these progress reports will be used to update the weed and plant disease management strategy.

− Annual review and revision of the weed and plant disease management strategy in light of control efficacy and best practice management guidelines in consultation with relevant government agencies. This process will identify the need for any further studies.

− Areas left devoid of vegetation following control of weed infestations are to be revegetated using known local-provenance native stock by a qualified bush revegetation contractor.
3. Terrestrial pest animal management strategy

3.1 Purpose and objectives

This Terrestrial Animal Pest Management Strategy describes Australia Pacific LNG’s proposed approach to biosecurity risk management as it pertains to pest (invasive) terrestrial fauna species associated with the construction and operation of Australia Pacific LNG’s proposed LNG facility on Curtis Island. The key outcome of this strategy is to ensure that appropriate biosecurity controls and procedures are implemented for the construction and operation of the LNG facility, to prevent the introduction of non-endemic species to Curtis Island as required under Condition 46 of the EPBC Act approval (EPBC 2009/4977).

Key targets and strategies for the management and mitigation of pest animals within the proposed LNG facility site have been identified in accordance with the approval conditions of EPBC 2009/4977 as described in section 1 of this plan. All animals will be controlled in accordance with the Animal Care and Protection Act 2001 (ACPA) and the Model code of practice for the destruction or capture, handling and marketing of feral livestock animals, available from the CSIRO.

3.2 Legislation

3.2.1 Pest animals

The Australian Pest Animal Strategy (APAS) addresses the undesirable impacts caused by pest (invasive) vertebrate animals in Australia and focuses on preventing new pest species from becoming established in Australia. It recognises that pest animals have major impacts on biodiversity, and additional economic and social costs. The strategy outlines specific guidelines for animal pest management in Australia including the need to establish a list of Pest Animals of National Significance, much like the WONS list for weed species, on which management efforts can be focused. This list is currently being developed and will be considered in future auditing of this strategy.

In Queensland the Land Protection (Pest and Stock Route Management) Act 2002 (LP[P&SRM]A) identifies declared animals that have been nominated for control. Declaration of pest animals imposes a legal responsibility for control by all landowners on land under their management, including all landowning state agencies. Under the (LP[P&SRM]A) it is considered an offence to introduce a pest animal into Queensland or feed, keep or release a declared pest animal in Queensland without a permit. There are three categories of declared animal pests in Queensland; class 1, 2 and 3, outlined below:

- Class 1 pest animals are not commonly present in Queensland, and if introduced would cause an adverse economic, environmental or social impact. Class 1 pests established in Queensland are subject to eradication from the state. Landowners must take reasonable steps to keep land free of Class 1 pests. Other powers of the Act apply.
- Class 2 pest animals are established in Queensland and have, or could have, a substantial adverse economic, environmental or social impact. The management of these pests requires coordination and they are subject to local government, community or landowner-led programs.
Landowners must take reasonable steps to keep land free of Class 2 pests. Other powers of the Act apply.

- Class 3 pest animals are established in Queensland and have, or could have, an adverse economic, environmental or social impact. A pest control notice can only be issued for these pests on land that is, or is adjacent to, an environmentally significant area. Thus, the adverse impact of species in this Class is primarily environmental. Only some of the other powers of the Act apply.

The classes of declared animals found on Curtis Island within the LNG facility site are listed in Table 3.1. No class 1 pest animals are known to occur on Curtis Island. Other terrestrial animal pests of significance include those species identified as key threatening processes to the long-term viability of native fauna species of national environmental significance listed under the EPBC Act.

Where management is required Australia Pacific LNG will consult with relevant agencies to confirm best practice management techniques for each species. This is necessary due to the labile nature of best practice management guidelines and standard operating procedures over time. Information contained in this strategy is accurate at the time of compilation.


### 3.3 Potential impacts and management

Desktop searches have identified 14 pest animal species within the wider study area (a 10km radius of the LNG facility site, comprising 10 mammal, three bird and one amphibian species. Of these, three species were recorded during pre-clearing field surveys within the development area (five mammal and one amphibian species) (Table 3.1). The proposed management area for terrestrial animal pests is within the boundary of the proposed LNG facility site.

**Table 3.1 Terrestrial animal pest species of the wider study area**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>LP(P&amp;SRM)A Status</th>
<th>Recorded on Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>cane toad</td>
<td><em>Rhinella marinus</em></td>
<td>Non Declared</td>
<td>Yes</td>
</tr>
<tr>
<td>rock dove</td>
<td><em>Columba livia</em></td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>house sparrow</td>
<td><em>Passer domesticus</em></td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>spotted dove</td>
<td><em>Streptopelia chinensis</em></td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>European cattle</td>
<td><em>Bos sp.</em></td>
<td>Non Declared</td>
<td>Yes</td>
</tr>
<tr>
<td>Dog</td>
<td><em>Canis lupus familiaris</em></td>
<td>Class 2</td>
<td>Yes</td>
</tr>
<tr>
<td>Horse</td>
<td><em>Equus caballus</em></td>
<td>Non Declared</td>
<td>Yes</td>
</tr>
<tr>
<td>Cat</td>
<td><em>Felis catus</em></td>
<td>Class 2</td>
<td>No</td>
</tr>
</tbody>
</table>
### 3.3.1 “Tramp” ant species

Tramp ant species are those that are able to establish invasive colonies from a small founder population once introduced to an area. The majority of tramp ant incursions into Australia are within sub-tropical and tropical region and the frequency of establishment is linked to climate matching between source regions and target localities. Southeast Qld represents a high risk area for tramp ant incursions because of the subtropical environment and over 40% of tramp ant interceptions in Australia have been in the Brisbane region. Invasive (tramp) ant species pose a major threat to Australian biodiversity and agriculture (PIAG 2004). The main vectors for introduction of tramp ant species are sea and air freight (54% and 44% of total introductions respectively between 1983 and 2003). Because tramp ants are a global problem and are spread in freight it is possible for a number of species to potentially reach Australia. Tramp ant species of high concern throughout the Pacific region including Australia are:

- Red fire Ant (*Solenopsis invicta*)
- Tropical fire ant (*Solenopsis geminata*)
- Yellow crazy ant (*Anoplolepis gracilipes*)
- Big headed ant (*Pheidole megacephala*)
- Singapore ant (*Monomorium destructor*)
- Ghost ant (*Tapinoma melanocephalum*)
- Papuan thief ant (*Solenopsis papuana*)
- Crazy ant (*Paratrechina longicornis*)
- Electric ant (*Wasmannia auropunctata*)
- Argentine ant (*Linepithema humile*)
- Pharaoh ant (*Monomorium pharaonis*)
- White footed ant (*Technomyrmex albipes*).
These high concern species have the potential to become invasive in Australia (DEH, 2006). The primary transport vector of tramp ants is the movement of substrates and materials already containing the species. High risk materials include soil, pots and potting mix, mulch and construction materials.

**Status, History, Ecology and Occurrence**

There have been incursions by three species of tramp ant into Queensland; species responsible are the yellow crazy ant, electric ant and red fire ant. No tramp ants were recorded on LNG facility site during the field surveys, although tramp ant species were not specifically targeted during survey work.

**Red fire ants** (*Solenopsis invicta*)

Red fire ants are the species of most concern in the region of the proposed LNG facility due to recent incursions of the species on the adjacent mainland. There have been containment zones for this species in Brisbane and Yarwun (Yarwun is located west of the Calliope River, upstream from the Port of Gladstone). Fire ants are a venomous, stinging species able to inflict repeated stings, resulting in a painful burning itching sensation. This species is native to South America.

**Yellow crazy ants** (*Anoplolepis gracilipes*)

Yellow crazy ants are a Class 1 declared pest in Queensland. This species is found throughout the Pacific region and is commonly transported in sea cargo. There are current containment areas for this species in Cairns and Townsville, with historic incursions at several other sites along the coast line.

**Electric ants** (*Wasmannia auropunctata*)

Electric ants are native to central and South America. Electric ants are now found in several near neighbours in the Pacific region including New Caledonia, the Solomon Islands and Vanuatu. In 2006, an outbreak of this species was discovered in the northern suburbs of Cairns and was the target of an eradication campaign.

**Management**

The primary focus for the management of tramp ants on-site is detection and prevention. The inspection of all cargo arriving from outside of Australian territories or from areas known to be occupied by a tramp ant species is vital to prevent introduction and further invasion. Detection requires the awareness of all staff and contractors to the threat of tramp ants establishing on-site. Early detection of an incursion will enable a more effective mitigation response. Biosecurity Queensland will be requested to provide specific advice on the management of an incursion by tramp ants should they be found on-site.

Management of fire ants is to be conducted in cooperation with Biosecurity Queensland Control Centre (telephone 13 25 23) and any discovery of an incursion is to be reported immediately. A request for site inspection for commercial operations is available at the DPI site: [http://www.dpi.qld.gov.au/4790_8027.htm](http://www.dpi.qld.gov.au/4790_8027.htm).

All staff on site are to be familiar with the potential for fire ants to occur on site, and regular inspections (three-monthly) are to be conducted for fire ant mounds.

Tramp ant species management forms listed below will be completed for any turf, retail soil, extracted soil or waste and mulch to be imported onto the proposed site if sourced from areas of fire ant intrusions.
3.3.2 Cane toad

Status
The cane toad is listed as a non-declared pest animal under the LP(P&SRM)A. All life stages of the cane toad are toxic, eggs, tadpoles, metamorphs and adults (Shine, 2009), and, in 2005, lethal ingestion of cane toads by native wildlife was listed as a key threatening process to native fauna species listed under the EPBC Act (DEWHA, 2010).

History and Ecology
The cane toad was introduced into Australia in the early 20th century to control sugar cane pests in northern Queensland. Cane toads are currently distributed throughout much of Queensland, northern NSW, the Northern Territory and northern parts of Western Australia.

Cane toads are opportunistic feeders that can consume a wide range of prey. Direct poisoning of predators is the most significant pathway by which cane toads impact on native fauna. Direct poisoning by cane toads has been widely reported in native reptiles, amphibians, birds and mammals (Shine, 2009). Due to their high population densities cane toads may compete with native vertebrates for food and shelter.

Occurrence
Cane toads are found across the Curtis Island Industry Precinct. Cane toads were abundant and observed breeding in the melaleuca wetland on site during March 2010. In the months following this event, cane toads of varying size were observed throughout the eucalypt woodland on site.

Management
There is currently no broad scale control method for cane toads (e.g. trapping or baiting). Where practicable, artificial water-holding facilities on the LNG facility site will be designed to minimise utilisation by cane toads. Cane toads are selective about breeding sites, and utilise shallow pools with still water, open, sparsely vegetated gradually sloping banks in preference to sites with steep edges, thick vegetation along the bank, deep water or flowing water (Hagman and Shine, 2006; Semeniuk et al., 2007).

3.3.3 Feral cattle

Status
Cattle are listed as non-declared pest animals under the LP(P&SRM)A.

History and ecology

Managed domestic herds of cattle are an integral part of Australia's agricultural industry, but feral cattle in Australia are considered carriers of significant disease, potentially affecting domestic cattle and human health (AHA, 2005). Feral cattle cause alteration of natural ecosystems through grazing pressure, increased erosion pressure and disturbance to natural water bodies. The presence of cattle is linked to reduction in biodiversity.

Occurrence

The Curtis Island Industry Precinct was historically part of a cattle property and feral cattle have been regularly observed within the LNG facility site. Tracks have been regularly observed around the wetland, salt pan, beaches and across vehicle tracks within the LNG facility site.

Management

Current strategies for the management of feral cattle include mustering, fencing and shooting. A boundary fence will limit the movement of cattle from, or to, the wider project area on Curtis Island. Any large scale efforts to control cattle within the wider area on Curtis Island will require a coordinated effort from the key stakeholders on Curtis Island or those with interests linked to the Island. At present there is no “Fact Sheet” available for the control of Feral Cattle in Queensland; however, control methods will be in accordance with the Code of Practice for the Welfare of Feral Livestock Animals, available at http://www.dpi.qld.gov.au/4790_6211.htm.

3.3.4 Feral horse

Status

Feral horses are listed as non-declared pest animals under the LP(P&SRM)A.

History and ecology

Horses are a well-known domestic animal, arriving in Australian with European settlement. Horses are often associated with Australian rural culture and control of the animal may generate an interest within the wider community. Horses reduce biodiversity values and severely impact on natural ecosystems primarily through the destruction of native vegetation, spreading weeds, soil erosion and the fouling of waterways: In addition, horses are susceptible to exotic diseases, including a number that are not yet established in Australia and are potentially a reservoir of exotic diseases (Csurhes et al., 2009). Feral horses are considered a danger to people as they can become aggressive when not accustomed to people.

Occurrence

Horses have been regularly seen within the development area and activity is regularly noticed around the wetland, salt pan, beaches and along access tracks within the LNG facility site. Horses have been recorded throughout the Curtis Island Industry Precinct.

Management

Feral horses are sedentary and will often remain within their established territories despite disturbance to the area. However it is considered unlikely that they will remain within the LNG facility site following clearing of vegetation from much of the site and the fencing of the area. Where it is safe to do so,
individual feral horses that remain on-site during the clearing phase will be eradicated by a professional shooter.

Alternative strategies for the management of feral horses include mustering, fertility control and exclusion fencing. Shooting, if undertaken, will be conducted with discretion due to potentially averse public reactions. Any large scale efforts to control horses on Curtis Island will require a coordinated effort from the key stakeholders on Curtis Island.


3.3.5 Feral pig

Status
Feral pigs are listed as a Class 2 pest animal under the LP(P&SRM)A. Predation on native wildlife species, habitat degradation, competition with wildlife for resources and disease transmission by feral pigs was listed in 2001 as a key threatening process to native fauna species listed under the EPBC Act.

History and Ecology
Feral pigs are found in a wide variety of habitats. The two requirements that restrict the distribution of feral pigs are abundant water and suitable cover. Feral pigs are considered to be one of the most widespread and damaging pest animals in Queensland (McGaw and Mitchell, 1998). Impacts may be through direct predation of smaller native animals or the consumption of native plants and soil disturbance. The feral pig additionally poses a serious threat to Queensland’s livestock industry and human health as a potential carrier or amplifier of disease (McGaw and Mitchell, 1998). An indirect impact is through the spread of the root rot fungus Phytophthora cinnamomi in areas where the fungus is prevalent.

Pigs have a high reproductive rate during favourable years. Breeding can occur throughout the year with a litter, averaging six young, produced every 12-15 months. Pigs are creatures of habit, tending to utilise the same tracks, water holes, feeding and resting areas unless disturbed by predators or human activities (McGaw and Mitchell, 1998).

Occurrence
Pigs have been recorded during surveys within the development area and activity is concentrated around the wetland, dam, mangroves and salt pan ecosystems on and around the proposed LNG facility.

Management
The eradication of pigs from a given region is not possible except on small islands and in some local areas (DEWHA, 2005). Australia Pacific LNG will employ a suitably qualified person to remove feral animals from site. A proposed fence around the LNG facility site on Curtis Island will assist in excluding pigs from within the LNG facility. Pigs are likely to continue to occur outside of this fenced area.
Cage traps should be considered to enable easier monitoring of activity around the property outside of the fenced area if necessary. Considering dispersal abilities and rates of reproduction, a control program within the LNG facility development area alone will have limited impact on the regional pig population on Curtis Island.

Establishment of long-term trapping sites is an effective way of monitoring the changes in pig populations in an area. If feral pigs are recorded on the land managed by Australia Pacific LNG traps will be considered to firstly remove any trappable pigs, thus mitigating damage from pigs and secondly to be incorporated into future mitigation efforts. Guidelines for population estimates and trap designs for feral pigs are available through DPI&F at the link provided below. If trapping is implemented it is essential that standardised, consistent trap effort and methodology is used to provide the most accurate population census data.

A coordinated effort with the key stakeholders on Curtis Island will be required to manage the feral pig population on Curtis Island; however a boundary fence around land managed by Australia Pacific LNG will mitigate the occurrence of pigs on site. Further information can be found at: http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/218534/Monitoring-techniques-for-vertebrate-pests---pigs.pdf.

### 3.3.6 Wild dog

**Status**

Wild dogs are listed as Class 2 pest animals under the LP(P&SRM)A. Wild dogs are unmanaged domestic dogs and dingo/domestic dog hybrids.

**History and Ecology**

Wild dogs are found throughout Queensland. These dogs cause significant widespread impacts on the cattle, sheep and goat industries through predation, disease transmission and lost production due to stress. It is estimated that wild dogs cost Queensland $67 million in 2008/09 (Hewitt, 2009).

**Occurrence**

A wild dog pup has been recorded within the development area on Curtis Island. Dog tracks have been observed at a variety of locations within the LNG facility site.

**Management**

The management of wild dogs in Queensland is directed and coordinated through the Queensland Wild Dog Strategy and a Memorandum of Understanding (MoU) 2005. The current Queensland Wild Dog Strategy aims to ensure reduction of wild dogs in coastal and rural areas, such as on Curtis Island.

A large body of documentation is available to direct land managers in the best practice management of wild dogs including that available from DPI&F at: http://www.dpi.qld.gov.au/4790_9154.htm#wild_dog_control.

Australia Pacific LNG will employ a suitably qualified person to remove feral animals from site. Fencing is useful for larger areas of control when the population of wild dogs is controlled within the fenced area. A boundary fence will exclude wild dogs from the LNG facility site on Curtis Island. Camera traps should be considered to enable easier monitoring of activity around the property if necessary.

If 1080 baiting is to be conducted a 1080 Pest Animal Bait User Declaration Form (or equivalent) will be completed and displayed accordingly and is available at http://www.animalcontrol.com.au/pdf/1080PestAnimalBaitUserDeclarationForm.pdf.

The code of practice for use of monofluoroacetate poisoning for wild dogs is available from DPI&F at http://www.dpi.qld.gov.au/4790_9160.htm and will be complied with.

Any large-scale efforts to control wild dogs within the wider area on Curtis Island will need to be undertaken in consultation with the key stakeholders as part of a broad scale control strategy.

3.3.7 Red fox

Status

The red (or European) fox is listed as a Class 2 pest under the under the LP(P&SRM)A. Predation by the red fox is listed as a key threatening process to native fauna species listed under the EPBC Act.

History and Ecology

Occurrence

Current studies have not recorded the fox within the boundaries of the proposed LNG facility site although they are recorded within the wider Curtis Island Industry Precinct and are known to occur across Curtis Island. A Wildlife Online database search indicates three records of this species within the wider study area (10km radius of the LNG facility site). Because of the high dispersal ability and large home range of foxes it is likely that they occasionally utilise the LNG facility site.

Management

Removal of foxes from a region is not feasible due to the fecundity and secretive nature of the species. Control of foxes is not possible without a substantial input of resources from all stakeholders in the area. Foxes are likely to disperse back into areas from which they are eradicated if control is not ongoing (DEWHA, 2008a). Any large scale efforts to manage foxes within the wider area on Curtis Island will need to be undertaken in consultation with the key stakeholders. The fox fact sheet is available from DPI&F at http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Fox-PA13.pdf.

3.3.8 Feral cat

Status

The feral cat is listed as a Class 2 pest under the under the LP(P&SRM)A. Predation by feral cats is listed as a key threatening process to native fauna species listed under the EPBC Act.
History and Ecology

The first record of cats being brought to Australia is with the first European settlers. Feral cats are now found throughout Australia, including Tasmania and on many offshore islands. Cats can colonise a wide range of habitats and eat a wide range of prey. Feral cats can survive with limited access to fresh water as adequate moisture is obtained from prey. Cats can kill fauna up to 3kg in weight but preferentially kill mammals less than 220g in weight and birds less than 200g in weight (DEWHA, 2008b). Feral cats carry infectious diseases that can be transmitted to native animals, domestic livestock and humans (DEWHA, 2008b). Cats produce two litters each year, in autumn and in spring, each containing about four kittens.

Occurrence

Current studies have not recorded feral cats within the Curtis Island Industry Precinct; however, a Wildlife Online database search indicates three records of this species within the wider study area (10km radius of the LNG facility site).

Management

Eradication of feral cats from the Australian mainland is not possible, particularly considering the prevalence of domestic cats; however, localised control may be possible (DEWHA, 2008b). Feral cat control within the facility boundary alone would be ineffectual as feral cats disperse widely.

The interaction between pest species means that the control of cats can have impacts on other invasive animals, such as rabbits and rats whereby the release from cat depredation allows increases in other pest species numbers. The impacts of a control program on other feral species will need to be considered along with programs for the control of these species.


3.3.9 Rabbit

Status

The rabbit is listed as a Class 2 pest under the under the Queensland LP(P&SRM)A. Competition and land degradation by feral rabbits are listed as a key threatening process under the EPBC Act (DEWHA 2008c).

History and Ecology

The European rabbit was deliberately released on the Australian mainland in the mid to late 1800s and is now found across most of the Australian mainland, except the far north. Rabbits are considered to be Australia’s most serious vertebrate pest. Rabbits impact native flora and fauna along with agricultural and pastoral industries. Rabbits have been implicated in the decline and extinction of many of Australia’s terrestrial mammals that weigh between 35 – 5,500g (DEWHA, 2008c).

Breeding is confined to the time of year when fresh young shoots are available; however, as many as nine litters can be produced in a good year. A litter can range from 4-6 kittens.
Occurrence

Current studies have not recorded the rabbit within the Curtis Island Industry Precinct; however, a Wildlife Online database search indicates three records of this species within the wider study area (10km radius of the LNG facility site).

Management

The focus of rabbit management generally includes abating impacts rather than prevention or eradication. Effective rabbit control requires integration of different methods of control including baiting, shooting and warren destruction. Poisoned rabbits have been implicated in trophic uptake of poisons and death of native wildlife species including sea-eagles which occur on the proposed LNG facility site. As such any poisoned rabbits should be sought and removed following targeted baiting campaigns. Rabbits are an important food source for foxes and cats. Considering this, control of rabbits should be integrated with the control of other pest species, such as cats and foxes.


3.3.10 Introduced rodents

There are three species of rodents that have been dispersed widely in association with the global movement of humans. These species are the house mouse (*Mus musculus*), brown rat (*Rattus norvegicus*) and black rat (*R. rattus*).

Rodents are considered carriers of zoonotic diseases and control programs for these species will reduce the risk of transmission to people (AHA, 2005). A presence on the Australian mainland and islands is an on-going risk to biodiversity. Exotic rodents:

- Eat native species and compete for food
- Carry diseases that may affect native animals
- Drive some species endemic to the island to extinction
- Extirpate some species from particular islands
- Continue to threaten native species on many islands
- Change ecosystems by more complex indirect effects by causing changes in species that ‘engineer’ the ecosystem – such as seabirds
- Act as the primary prey for other exotic predators such as feral cats or foxes, which then threaten native species (DEWHA, 2009).

Status

The house mouse, brown rat and black rat are listed as non-declared pests under the LP(P&SRM)A. In 2006, the presents of exotic rodents on islands was listed as a key threatening process to native fauna species listed under the EPBC Act.
History and Ecology

*House Mouse (Mus musculus)*

The house mouse is widespread through the Australian mainland and many of the offshore islands. Mice are considered a major agricultural pest, reaching plague proportions under favourable conditions. Mice are opportunistic breeders, with a gestation period of 19 days and the ability to have a litter of 4-8 pups. Outside of plague periods, mice remain in low numbers within the landscape and it is often difficult to detect their presence. The house mouse is known to swim during plague periods, although it is not considered to be a very competent swimmer (DEWHA, 2009b).

*Black Rat (Rattus rattus)*

Black rats are common around the Australian coastline with the highest densities being reached near human habitation. The rats are not found in the central region of Australia, considered to be due to a lack of water and competition from native rodents. Breeding can occur throughout the year with litter sizes ranging from 5-10 young. Black rats are very capable swimmers and are able to cross channels hundreds of metres in width (DEWHA, 2009b).

*Brown Rat (Rattus norvegicus)*

The brown rat has a patchy distribution around Australia, associated with coastal cities and towns in wetter regions. It is however, rare in the tropics. Breeding can occur throughout the year, with litter sizes ranging from 7-10 offspring. The brown rat is a very capable swimmer; able to swim to islands that are 2km from the mainland (DEWHA, 2009b).

**Occurrence**

The house mouse has not been reported within the Curtis Island Industry Precinct. However, a Wildlife Online search of the wider study area returned 13 records of this species.

The black rat has been recorded within the LNG facility site.

The brown rat has not been recorded within the Curtis Island Industry Precinct or within the wider study area but is likely to occur within the vicinity and potentially increase in numbers following disturbance to the site and construction as introduced pest rodents are human-commensal and often increase in numbers in areas of human activity.

**Management**

There are several native rodents on Curtis Island that will be negatively impacted by broad-scale non-specific rodent eradication measures. These species include the threatened water mouse (*Xeromys myoides*). Any broad scale or non-specific rodent control program will need to consider potential impacts to non-target species. Given the conservation status of the water mouse it is not recommended that broad-scale rodent poisoning be utilised in the region of the proposed LNG facility site. Environmental managers on site will be trained to positively identify native rodents from pest rodent species to avoid impacting on protected species during rodent control operations if required.

Baiting stations have been utilised successfully on some islands to control pest rodents. Baiting stations are designed to allow access by pest rodents but limit access by non-target species. Further investigation would be required in the design of targeted baiting stations used in the wider project area in consultation with a qualified ecologist. Baiting and trapping for pest rodents is only to be conducted...
once target species have been identified using non-injurious trapping and census techniques by a qualified ecologist, and will occur in response to increased number of pest rodents on site.

Food waste from the proposed facility will be contained within sealed rodent-proof containers prior to disposal and will not at any time be in a condition that is accessible to rodents. Human food waste is a principal cause of increased pest rodent numbers and will be managed. Garbage facilities used for food waste will be inspected on a three-monthly basis to ascertain the effectiveness of rodent-proofing. Immediate improvements to garbage storage and disposal will be implemented if rodents are found to be accessing food waste on site until there is no evidence of rodents accessing food waste.

Effective mooring line barriers should be in place for any international ships docking at the proposed LNG facility and adjacent shipping facilities on Curtis Island to prevent the movement of pest rodents between land and vessels.

### 3.3.11 Pest animal control adjacent to the proposed LNG site

A buffer zone of 200m around the proposed LNG facility site is to be subject to pest animal assessment, management and control where feasible. Pest animals will also be eradicated or managed if found at Laird Point, north-west of the proposed facility. This is crucial to maintaining the ecological integrity and biodiversity values of Laird Point. If pest animals are not managed along the northern and north-western boundary of the LNG facility it is likely to have detrimental impacts on this environmentally sensitive area. As such Australia Pacific LNG will conduct annual surveys for pest animals both on-site and along the northern and eastern boundary of the proposed site. These surveys can be undertaken in conjunction with surveys for weed plants and are to be conducted by a suitably qualified person. The annual survey reports in conjunction with incidental reports from Site Managers and users will be used as auditable measures of pest animal management and submitted annually to the appropriate government departments (presently DERM and SEWPac).

The north-eastern and eastern boundaries of the proposed LNG facility are adjoined by the Curtis Island Corridor Sub-precinct and are outside of the Curtis Island Environmental Management Precinct. To ensure that there are not adverse impacts from pest animals along this corridor that may intrude into the Environmental Management precinct, annual auditable surveys of pest animals will be undertaken from the boundary of the land managed by Australia Pacific LNG on Curtis Island extending a minimum of 200m outside the proposed facility boundary. Class 1 pest species will be eradicated from the 200m zone alongside the proposed LNG facility site and Class 2 pest animals are to be eradicated where feasible or their numbers reduced. Auditing will be conducted according to the results of annual surveys and any incidental reporting by Site and Environmental Managers on site.

The southern boundary of the proposed Australia Pacific LNG facility on Curtis Island is shared with the proposed Queensland Curtis LNG facility and will be subject to extensive land disturbance and contained within a fenced area. Therefore the southern boundary of the proposed LNG facility will not be suitable habitat for the majority of pest animal species. Because of the shared property boundary adjoining two LNG plants there is no requirement to manage pest animals outside of the southern boundary of the Australia Pacific LNG facility.
3.3.12 Pest animal control within the proposed LNG site

The most effective mitigation strategy for the majority of pest animal species that occur on the proposed Australia Pacific LNG facility site is establishment and maintenance of a boundary fence to exclude pests. This fence should be built of weatherproof chain-link fence at least 2 metres high where practicable. It will not have barbed wire included in the design to avoid harming protected native fauna species, including, but not limited to, flying mammals (e.g. *Petaurus* spp., known to occur on and adjacent to the site). The clearing of most of the existing vegetation onsite will cause the larger pest animal species that occur on site to vacate away from the area prior to construction works including feral cattle, pigs, horses, foxes, rabbits and wild dogs. These species are highly mobile and utilise large areas of habitat, and are likely to vacate the site due to disturbance during construction and clearing of vegetation.

The perimeter fence should be constructed post-clearing to allow any highly mobile pest animal species to vacate the area, rather than being trapped within the fenced site area. Remnant vegetation retained within the proposed site (and therefore within the boundary fence) will not be of adequate size and habitat structure to support populations of feral cattle, pigs, horses, foxes, rabbits and wild dogs. By locating a boundary fence along the perimeter of the land used by Australia Pacific LNG, the occurrence of feral cattle, pigs, horses, foxes, rabbits and wild dogs on land managed by Australia Pacific LNG on Curtis Island will be ameliorated.

Should individual feral cattle, pigs, horses, foxes, rabbits and wild dogs be found within the fenced site (and therefore unable to easily leave the fenced area) it will be the responsibility of Australia Pacific LNG to eradicate these individuals. Eradication measures may include baiting, trapping or shooting in accordance with ethical and practical considerations and is to be determined by the environmental manager of the proposed LNG facility site.

Boundary fencing will be maintained and inspected for breaches on a three-monthly basis to avoid larger pest animal species entering the proposed LNG facility site.

Garbage disposal facilities accessible to rodents are to be avoided where practicable. The use of sealed waste storage containers on site is necessary to mitigate increases in pest rodents on site. Baiting for rodents is only to occur in consultation with a qualified biologist following accurate identification of target species using non-lethal trapping methods (Elliot traps or equivalent). If pest rodent numbers increase on site Australia Pacific LNG will consult with a qualified ecologist to design and implement baiting stations, otherwise no poison baiting or trapping for rodents is to occur on or adjacent to the proposed APNLG facility on Curtis Island.
3.3.13 **Construction of water holding bodies**

Construction of permanent water-holding bodies on site will be in accordance with measures to mitigate use by cane toads where practicable. Because cane toads cannot be feasibly eradicated from an area, best practice management currently precludes facilitation of breeding on site by cane toads. By constructing steep-walled water holding bodies and establishing vegetation around the perimeter of these water bodies, their utilisation by cane toads and suitability as breeding sites for the species are mitigated against. Shallow water, gently-sloped banks and sparsely vegetated banks should be avoided where practicable (Hagman and Shine 2006). Environmental managers on site will be trained to identify cane toads at all stages of development from eggs to adults to avoid impacting negatively on native, protected frog species that occur on the proposed LNG facility site.
### Table 3.2 Dispersal vectors for pest animals occurring on the proposed APLNG site at Curtis Island

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Release of domestic animals</td>
<td>Low</td>
<td>Cats, dogs</td>
<td>No domestic animals to be taken onto Curtis Island.</td>
<td>Control by baiting, trapping or shooting where practicable</td>
<td>Visual surveys and reporting on an ongoing basis during construction and operative phase by site environmental manager</td>
<td></td>
<td>Qualified ecologists to survey visually for pest animal species on and offsite on an annual basis between October and April to facilitate detection</td>
</tr>
<tr>
<td>Dispersal of animals on foot from surrounding environs</td>
<td>High</td>
<td>All pest species</td>
<td>Fencing of the site will prevent the majority of pest animals from entering the site. Offsite, particularly on Laird Point there is a high risk of all pest species re-entering areas and increasing in numbers</td>
<td>Control measures according to specific species (see section 3 of this plan)</td>
<td>Inspections to be undertaken annually onsite and offsite</td>
<td></td>
<td>Qualified ecologists to survey visually for pest animal species on and offsite on an annual basis between October and April to facilitate detection</td>
</tr>
<tr>
<td>Shipping freight arrivals (International)</td>
<td>High</td>
<td>Tramp ant species, non-native rodents, potentially several invasive species</td>
<td>AQIS to inspect all incoming cargo</td>
<td>Priority to be given to the control of any new exotic species discovered, with immediate consultation with Biosecurity Queensland and DPI&amp;F</td>
<td>AQIS to inspect all incoming international freight</td>
<td></td>
<td>Qualified ecologists to survey visually for all pest species on and offsite on an annual basis.</td>
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</tr>
<tr>
<td>Shipping freight arrivals (domestic)</td>
<td>High</td>
<td>Tramp ant species, non-native rodents</td>
<td>Visual inspection of incoming domestic freight for potential pest species, particularly tramp ants</td>
<td>Urgent priority if any species of tramp ant is discovered, requiring immediate consultation with Biosecurity Queensland and DPI&amp;F</td>
<td>Visual inspection of all incoming freight by environmental manager on site</td>
<td>Inspections on arrival of any domestic freight. Qualified ecologists to survey visually for tramp ant species on and offsite on an annual basis</td>
<td></td>
</tr>
<tr>
<td>Construction materials</td>
<td>low</td>
<td>Tramp ant species</td>
<td>Sourcing of all incoming construction materials from areas free of tramp ant occurrence</td>
<td>Urgent priority if any species of tramp ant is discovered, requiring immediate consultation with Biosecurity Queensland and DPI&amp;F</td>
<td>All incoming soil, mulch and turf from within known tramp ant incursions to be subject to DPI&amp;F inspections and declaration forms completed (available online from DPI&amp;F website).</td>
<td>Qualified ecologists to survey visually for tramp ant species on and offsite on an annual basis.</td>
<td></td>
</tr>
<tr>
<td>Soil and other substratum</td>
<td>high</td>
<td>Tramp ant species</td>
<td>Sourcing fill and substrate from tramp ant-free areas and</td>
<td>Urgent priority if any species is discovered,</td>
<td>All incoming soil, mulch and turf from within known</td>
<td>Qualified ecologists to survey visually for</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>suppliers</td>
<td></td>
<td>requiring immediate consultation with Biosecurity Queensland and DPI&amp;F</td>
<td>tramp ant incursions to be subject to DPI&amp;F inspections and declaration forms completed (available online from DPI&amp;F website).</td>
<td>tramp ant species on and offsite on an annual basis.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Inspections to be conducted prior to fill or substrate being assigned to onsite area</td>
<td></td>
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</tbody>
</table>
3.3.14 AQIS inspection of incoming freight and materials

Condition 46 of the Approval Conditions (EPBC 2009/4977) requires inspection of vessels and management of supply chains to prevent introduction of pest animals onto the LNG facility site on Curtis Island. If required due to direct transport of international freight to Curtis Island an AQIS-approved quarantine inspection facility will be established on the LNG site that will routinely inspect all incoming cargo and materials arriving from outside of Australian territories. The inspection of vessels by AQIS or agents thereof will ensure that the introduction of new pest animal species is mitigated according to best-practice management in biosecurity.

The docking of ships at the proposed LNG facility poses a risk to Australia’s biosecurity. It is expected that all international freight will be made available for inspection by AQIS staff or equivalent for potentially invasive species as soon as possible on arrival, and that any substrates imported onto the island will be verified as clean and free pest species and recorded using the appropriate reporting procedures including the Incident Reporting Form (Appendix 9).

3.3.15 Performance measures


Any control of pest animal species will also comply with existing Codes of Practice for Feral Animals, including those listed below:

- Model Code of Practice for the Humane Control of Feral Cats (PDF - 282 KB)
- Model Code of Practice for the Humane Control of Feral Horses (PDF - 283 KB)
- Model Code of Practice for the Humane Control of Feral Pigs (PDF - 146 KB)
- Model Code of Practice for the Humane Control of Foxes (PDF - 156 KB)
- Model Code of Practice for the Humane Control of Rabbits (PDF - 174 KB)
- Model Code of Practice for the Humane Control of Wild Dogs (PDF - 155 KB)

The development of auditable performance measures for pest animal management and mitigation within the proposed LNG facility site requires baseline monitoring of pest animal populations following the construction of a boundary fence along the perimeter of the site. An auditable baseline of populations of pest animal species presence provides a standard against which the efficacy of control measures undertaken by Australia Pacific LNG can be assessed. Annual census reports by a qualified ecologist, compiled reports of incidental sightings and management actions taken following sightings of declared pest species can be audited against the initial census. The development of a baseline for the site is not practicable prior to the establishment and maintenance of adequate fencing due to the prevalence of pest animals in the wider region and the likelihood of movement of pest animals onto the site prior to fencing from land managed by other landholders.
Any new invasive or pest species that are recorded on site during formal or incidental surveys will require specific management and eradication. In the case of declared animals increasing in number on site the Land Managers will take immediate action to reduce numbers or eradicate the pest species from within site boundaries.

Table 3.3 Pest animal management strategy

<table>
<thead>
<tr>
<th>Pest Species</th>
<th>Management Goal</th>
<th>Management Action</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Tramp” Ants (various species)</td>
<td>Zero occurrence of tramp ants on site and on Curtis Island</td>
<td>Materials, equipment and machinery will be inspected prior to landing on Curtis Island. Immediate urgent action required in cooperation with Biosecurity Queensland on identification of any tramp ant incursions</td>
<td>Construction Contractor</td>
</tr>
<tr>
<td>Cane toads (Chaunus marinus)</td>
<td>Reduction in the breeding habitat available within the LNG facility site</td>
<td>Where practicable the water holding facilities on site will be designed to minimise the occurrence of shallow pools with still water and open unvegetated gradually sloping banks</td>
<td>Construction Contractor</td>
</tr>
<tr>
<td>Feral cattle (Bos sp.)</td>
<td>Removal of cattle from the LNG facility site, Laird Point and within 200m of the site boundary</td>
<td>Fencing of site and extirpation of cattle adjacent to site from Laird Point and within 200m of the northern and eastern site boundaries A qualified contractor will be engaged to muster or shoot any cattle remaining within the LNG facility site</td>
<td>Construction Contractor</td>
</tr>
<tr>
<td>Feral horse (Equus caballus)</td>
<td>Removal of horses from the LNG facility site, Laird Point and within 200m of the site boundary</td>
<td>Fencing of site and extirpation of any horses adjacent to site from Laird Point and within 200m of the northern and eastern site boundaries Control measures will be undertaken by a qualified contractor</td>
<td>Construction Contractor</td>
</tr>
<tr>
<td>Feral pig (Sus scrofa)</td>
<td>Removal of pigs from the LNG facility site, Laird Point and within</td>
<td>Fencing of site and trapping and/or shooting of any pigs adjacent to site from Laird Point and within</td>
<td>Construction Contractor</td>
</tr>
<tr>
<td>Pest Species</td>
<td>Management Goal</td>
<td>Management Action</td>
<td>Responsibility</td>
</tr>
<tr>
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</tr>
<tr>
<td>Wild dog (<em>Canis lupus domesticus</em>)</td>
<td>Removal of wild dogs from the LNG facility site, Laird Point and within 200m of the site boundary</td>
<td>Fencing of site and extirpation by trapping, baiting or shooting of wild dogs adjacent to site, from Laird Point and within 200m of the northern and eastern site boundaries</td>
<td>Construction Contractor</td>
</tr>
<tr>
<td></td>
<td>Control of wild dog numbers surrounding the LNG facility</td>
<td>Trapping or baiting if necessary will be by qualified contractor.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No domestic dogs to be brought onto Curtis Island</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red fox (<em>Vulpes vulpes</em>)</td>
<td>Removal of red foxes from the LNG facility site, Laird Point and within 200m of the site boundary</td>
<td>Fencing of site and extirpation of wild dogs adjacent to site, from Laird Point and within 200m of the northern and eastern site boundaries.</td>
<td>Construction Contractor</td>
</tr>
<tr>
<td></td>
<td>Control of red fox numbers surrounding the LNG facility</td>
<td>Trapping or baiting if necessary will be conducted by qualified contractor.</td>
<td></td>
</tr>
<tr>
<td>Feral cat (<em>Felis catus</em>)</td>
<td>Removal of any feral cats found on site, in the vicinity of Laird Point and within 200m of site</td>
<td>Trapping and removal of feral cats by qualified contractor on site and surrounding area including Laird Point if their presence is confirmed.</td>
<td>Construction Contractor</td>
</tr>
<tr>
<td></td>
<td>No domestic cats to be brought onto Curtis Island</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rabbits (<em>Oryctolagus cuniculus</em>)</td>
<td>Minimising rabbit numbers in and surrounding the proposed LNG facility</td>
<td>Baiting and destruction of warrens where identified by qualified contractor.</td>
<td>Construction Contractor</td>
</tr>
<tr>
<td>Mice (<em>Mus musculus</em>) and black rats (<em>Rattus rattus</em>)</td>
<td>Minimising exotic rodent numbers in and surrounding the proposed LNG facility</td>
<td>Baiting to be conducted using specialised bait stations in consultation with specialist biologist to ensure correct</td>
<td>Construction Contractor</td>
</tr>
</tbody>
</table>
### Pest Species Management Goal Management Action Responsibility

<table>
<thead>
<tr>
<th>Pest Species</th>
<th>Management Goal</th>
<th>Management Action</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>All pest animals</td>
<td>Control of pest animals within the wider area on Curtis Island</td>
<td>Key stakeholders on Curtis Island will be engaged with to coordinate efforts to manage pest fauna within the wider area on Curtis Island.</td>
<td>Australia Pacific LNG Site Manager</td>
</tr>
<tr>
<td></td>
<td>Monitoring of pest animal numbers to ensure compliance with legislation and mitigation of impacts on and off-site including Laird Point</td>
<td>Annual surveys by specialist biologist</td>
<td>Incidental reporting by all staff on site</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reporting of findings for auditing purposes using standardised report forms</td>
<td></td>
</tr>
</tbody>
</table>

### 3.4 Animal diseases

Australian quarantine regulations apply to all animals and animals products entering Australia. The Australian Quarantine and Inspection Service (AQIS) administers various Acts, such as the Quarantine Act 1908 and Imported Food Control Act 1992 and subsequent legislation in order to protect Australia's animal and human health status. All products and materials imported into Australia require AQIS inspection and clearance.

The Australian Veterinary Emergency Plan (AUSVETPLAN) outlines the national coordination of Emergency Animal Disease (EAD) responses. Under this plan each State and Territory has operational responsibility for the control and eradication of animal diseases, whether endemic or exotic, within its borders. The Australian Government has powers under the Quarantine Act 1908 to support the States and Territories where appropriate. The level of support is also outlined in the AUSVETPLAN.

There are 63 listed EADs in Australia, of which 35 have never been recorded in Australia, 21 have occurred in Australia in the past and seven are present within Australian borders. These diseases are known to affect humans, native wildlife and domestic stock. The main transmission pathways for these animal diseases are the transport of live animals, live animal products, fomites (inanimate objects capable of carrying germs), aerosol, semen and disease vectors, such as mosquitoes and ticks.
3.4.1 Disease management strategy

There will be no live animals intentionally imported directly to Curtis Island. Vehicles, machinery, plant equipment and materials imported from overseas will be inspected by quarantine and customs in accordance with the requirements and protocols of AQIS. To facilitate AQIS inspections in the event of international shipments direct to Curtis Island, a quarantine area will be established on Curtis Island. Australia Pacific LNG will work with AQIS in the event of direct international shipping to Curtis Island to make available equipment to facilitate inspections by AQIS. Because of the close proximity to the mainland it is expected that many invasive pest species currently present on the island will be able to recolonise the island from the mainland.

Prior to the commencement of international shipments, staff, contractors and visitors to the Curtis Island LNG facility will be inducted with respect the quarantine requirements of the site, including identification of the main transmission pathways for animal diseases. The induction will outline the procedure for reporting potential items that may facilitate the transmission of animal disease. Any materials suspected of animal disease transmission will be immediately reported to DPI&F. DPI&F will outline further actions to be taken for containment of the material prior to diagnosis and possible treatment.

If any animal disease or zoonoses are identified on or around the LNG facility there is to be consultation between relevant governing bodies (Biosecurity Queensland, DPI&F) and Australia Pacific LNG site managers as to appropriate mitigation and control measures. This is to be a high priority action immediate on identification of possible zoonosis.
4. **Marine pest management strategy**

4.1 **Purpose and objectives**

The Marine Pest Management Strategy outlines the potential risks associated with invasive marine pests, the legislative requirements with respect to ballast water management and identifies a range of other management measures for the minimisation and/or mitigation of the risk of introduction of marine pests. This strategy is relevant to quarantine management in areas that could potentially be impacted by project-related shipping, namely the Port Curtis area and immediate surrounds including the Great Barrier Reef World Heritage Area.

This strategy is to be reviewed and revised as necessary prior to the commencement of construction and operational activity requiring international shipping to the proposed ANPLG facility.

Australia Pacific LNG is committed to working with the Gladstone Ports Corporation and other users to minimise the risk of marine pest introductions and to respond appropriately if marine pest incursions are detected. Australia Pacific LNG will at all times adhere to Commonwealth and State government biofouling and ballast water management requirements to provide for a low risk of the introduction of marine pests to the area via construction works and the operations of the LNG facility.

4.2 **The National system**

A set of measures addressing the threat from marine pests is being implemented under the National System for the Prevention and Management of Marine Pest Incursions (the National System). Prevention and management of marine pests from ballast waters is addressed under the Australian Ballast Water Management Requirements, which is part of the AQIS charter. These AQIS guidelines are consistent with the International Maritime Organisation (IMO) guidelines for minimising the risk of translocation of harmful aquatic species in ships’ ballast water.

The National System has three main aims:

- Preventing marine pests from arriving in Australian waters or spreading to new areas.
- Providing a coordinated emergency response should a new pest arrive in Australian waters.
- Controlling and managing marine pests already here, where eradication is not feasible.

These aims are targeted through:

- Preventative measures to reduce the risk of introduction and spread of marine pests, including management of ballast waters, biofouling and aquarium trade.
- An Emergency Marine Pest Plan to control or eradicate pests that have entered Australian waters.
- On-going management and control of marine pests already established in Australia, where eradication is not feasible.
4.3 Marine pest species

Introduced marine pests are non-native plants or animals that have been introduced to Australia through human activities such as shipping. The introduction of foreign marine organisms through ships’ ballast water and hull fouling is a major concern for Australia. In southern waters of Australia (e.g. Tasmania), populations of some species, such as the north Pacific seastar (*Asterias amurensis*), have increased rapidly to the extent that these species now pose a serious threat to some native species and to valuable commercial fisheries and aquaculture operations. Invasive marine species are widely regarded as an increasing global environmental problem, largely as a result of the increasing shipping trade between nations.

The two main vectors of marine pest invasions are biofouling, where marine pests attach themselves to boat hulls, anchor chains and fishing gear and through the containment of these species within a vessel’s ballast waters.

The most recent survey to ascertain the presence of marine pests at Port Curtis found ten introduced species; however none of the ten introduced species identified are considered marine pests (Lewis, Hewitt and Melzer, 2001). Appendix 8 lists those species which are considered a risk to Queensland. The list was produced from the National Introduced Marine Pest Information System (NIMPIS), a central repository developed to support the National System and provide summary information to assist marine pest response management.

4.4 Management strategy

4.4.1 Potential impacts of marine pest species

Invasive Marine Species

Invasive marine species can have a significant impact on Australia’s marine industries and environment if conditions are favourable for establishment. The impacts of an invasive species outbreak can lead to impacts to human health, fisheries and aquaculture, shipping and ports, tourism and ecosystem health.

The modes of entry of marine pests into Australian ports may be through a variety of human and natural means including, ballast water, biofouling (attached to vessels’ hulls, ropes, anchors and other equipment), aquaculture operations, marine debris, and ocean current movements.

It is critical that due regard is given to the fact that a marine pest introduced to this area could readily move to other coastal locations, by infesting vessels that move between Port Curtis and other Australian ports on a frequent basis and thereby naturally disperse into the Great Barrier Reef Marine Park. According to the most recent (Lewis et al. 2001) marine pest survey, Port Curtis, identified for on-going monitoring under the National System, had not been impacted by any invasive marine pest taxa.
Biofouling

Biofouling (or fouling) is the accumulation of aquatic microorganisms, algae, plants and animals on vessel hulls (e.g. sea chests) and submerged surfaces. The levels of potential biofouling increases the longer a vessel or structure remains submerged in seawater.

Ballast Water and Contaminated Sediments

Sea-going craft such as industrial container ships and dredging vessels have a ballast tank that can hold water and sediment in order to maintain ship stability whilst in transit and aid passage in varying water depths, by varying the buoyancy of the vessel according to how much ballast is held within the ballast tank. These vessels often move water and sediments, in and out of the ballast tanks, between operating locations. This practice can facilitate translocation of invasive marine pest taxa as the taxa can be carried by these types of vessels.

Under the IMO International Convention for the Control and Management of Ships’ Ballast Water and Sediments 2004, signatories, including Australia, are legally obligated to “prevent, minimise and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments”.

Australian ballast water management requirements are consistent with IMO guidelines for minimising the risk of translocation of harmful aquatic species in ships' ballast water. Whilst the safety of vessels and crew is critical, vessel ballast water management will comply with Australian requirements in accordance with the IMO guidelines and the Mariners' Guide to Ballast Water Regulation in Australia.

Microscopic organisms, such as dinoflagellate cysts, within water and associated sediments can be transported between shipping locations, when the organisms are taken into the ships’ ballast tanks, and it is therefore necessary that management requirements, as implemented by AQIS, are adhered to at all times.

4.4.2 Risk assessment

For a vessel or equipment to cause a biofouling marine pest incursion, three steps need to occur, as follows:

- Colonisation and establishment of the marine pest on a vector (vessel, equipment or structure) in a donor region (e.g. home port, harbour or coastal project site where a marine pest is established).
- Survival of the settled marine pests on the vector during the voyage from the donor to the recipient region.
- Colonisation (e.g. by reproduction or dislodgement) of the recipient region by the marine pest, followed by successful establishment of a viable new local population.

Clear and detailed records of vessel voyages (a ship’s log), biofouling mitigation, maintenance and repairs carried out on a vessel will be kept to aide quarantine management.
4.4.3 Monitoring and marine pest assessment

Routine marine pest monitoring in the Port Curtis region will provide early detection of new pest translocations and inform emergency response and the National Introduced Marine Pests Coordination Group (NIMPCG) comprised of representatives of the National System partners (government – including SEWPaC), industry - including Ports Australia, and environmental partners including OceanWatch Australia). This monitoring programme will be based on the National System processes, standards and rationale, as described in the Australian Marine Pest Monitoring Manual and Guidelines.

The Australian Marine Pest Monitoring Manual details the:

- Monitoring design, including sampling procedures and species selection.
- Field guides for sampling techniques and collection processes.
- Sample handling, preservation and analysis procedures.
- Reporting format, including standard data sheets and reporting forms.

The Australian Marine Pest Monitoring Guidelines outlines the:

- Decision process for selecting the priority locations and monitoring target species in Australia.
- Governance arrangements for the implementation of monitoring programs.
- Design pathways and management actions stemming from monitoring results.
- Review process to ensure future improvement to the monitoring programs, the manual and guidelines and the monitoring strategy.

4.4.4 Management of ballast water and associated sediment discharges

AQIS introduced controls for ballast water discharge in 2001. Vessels leaving ports known or likely to have marine pests present and en route to docking locations in Australia are considered high risk and as such ballast water and sediments from the vessel’s home port, likely to contain marine pests, are not allowed to be discharged into Australia’s territorial sea (normally waters extending 12 nautical miles from the Australian coastline).

Given the ecological and commercial value of the area, it is important that no exotic marine pests are imported through ballast water or associated sediments. There are no areas in or close to the Port that are suitable for the discharge of moderate or higher risk ballast water.

AQIS is the agency responsible for ballast water management and as such makes determinations as to whether ballast water can be discharged within Australian waters and where the discharge may be permitted. All ships on international voyages will abide by Australian ballast water management requirements issued by AQIS.

Sediment discharge from ballast storage tanks will only be deposited in a designated place approved by AQIS on arrival. Due to the proximity of the Great Barrier Reef Marine Park, there are no suitable areas for ship discharge of sediment within Port Curtis.
Ships travelling from other Australian ports are requested to carry out the discharge of ballast waters as far as practical outside port waters to help prevent the secondary transposition of exotic marine species.

It is likely that the majority of the port area is generally suitable for ballast water uptake, although the water quality may have a higher sediment load near the coast.

4.4.5 Management of hull fouling

The Australian Government has established national biofouling management guidelines (National System, 2009) to reduce the chance of introducing marine pests through shipping activities, including through the use of dredgers. This includes a visual inspection of any dredger coming from an area of high risk marine pests to demonstrate that it is not carrying any pest taxa of concern. By adhering to these processes, the risk of introducing marine pests to Port Curtis as a consequence of construction work can be minimised.

4.4.6 Management of contaminated sediments

Under AQIS shipping requirements, sediments from ballast tanks will not be discharged in Australian waters.

Ballast tank stripping using pumps that are permanent fixtures on a vessel is acceptable.

The use of portable pumps to strip out ballast tanks is not permitted. If ballast tank sediments are manually removed from tanks, the sedimentary material will not be dumped in Australian ports or waters. The sedimentary material from ballast tanks may be landed as Quarantine Waste in approved Australian ports. Alternatively it may be dumped into the sea in deep water at a depth of at least 200m, outside the Australian territorial sea and preferably outside the Australian exclusive economic zone (typically 200 nautical miles from the coastline).

4.4.7 Biofouling management measures

Biofouling management measures will be considered during design and construction of vessels, along with during operations, maintenance and repair. Australia Pacific LNG will audit the LNG carriers on a regular basis.

Design and Construction

Hull voids and openings and other external niches will be avoided when designing a vessel, in order to avoid the provision of areas in which marine pests may accumulate. If not feasible to avoid, these niches should be designed for easy inspection access, cleaning and application of antifouling agents. The rounding or bevelling of protrusions on intake and outlet ports and hull openings will promote more effective application of antifouling coatings. Gaps in and behind anode and cathode devices should be sealed.

Operation

The following biofouling management practices will be considered during operations:

- Selection of antifouling coatings according to the type of vessel operations, operating speed, maintenance and docking cycles.
• Pre-voyage vessel checks on vessels travelling between similar marine biogeographic regions, with the potential to facilitate marine pest translocation and introduction between the two areas.
• Application of antifouling coatings, particularly on vessels that are in dock or operating at low speeds for extended periods.
• Checking anchors, anchor wells, cables and chain lockers, berthing lines, booms and other floatation devices that are periodically immersed in water and if necessary removing biofouling, mud and sediments by appropriate means, e.g. high pressure washdown.
• Australia Pacific LNG will audit the LNG carriers on a regular basis.

Maintenance and Repair

The following biofouling management practices will be considered during vessel maintenance and repair:

• Regular slipping and drydocking of vessels should be undertaken to repair and renew the antifouling coating. The antifouling coating should be applied as directed by the antifouling coating manufacturer, within the lifetime projected by the manufacturer. Slipping and drydocking allows access for inspection, detection and removal of biofouling from the hull and niche areas.
• In-water inspection by dive or remote operated vehicle (ROV) surveys can be used as a logistically simpler and less expensive alternative to slipping or drydocking. However there are limitations on visibility and dive time, as well as accessibility to niches when the vessel is submerged.
• In-water cleaning of hulls and propellers should be carried to remove biofouling and reduce the risk of translocating marine pests, as well as reducing drag and improving propeller efficiency. Cleaning should be carried out in accordance with the Australian and New Zealand Environment and Conservation Council (ANZECC) Code of Practice for Antifouling and In-Water Hull Cleaning and Maintenance 1997 (the ANZECC Code; under review). The ANZECC Code for in-water cleaning in Australian waters serves to prevent the release of harmful antifouling coating biocide agents that can harm the local environment.
• Regular inspection and maintenance of internal seawater systems (including ballast tanks) can identify biofouling accumulations and inform when and how treatment of the internal seawater systems is actioned, either by acid cleaning of pipework or by rigorous chemical dosing of the whole system.
• Australia Pacific LNG will audit the LNG carriers on a regular basis.
5. References


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Appendix 1  Target Weed Species Profiles
Priority Weed Species

**Rubber Vine (Cryptostegia grandiflora)**

*Weeds of National Significance (Australia)*
*Class 2 Declared Plant (Queensland)*

Rubber Vine can grow as a shrub to 3 m (unsupported) or as a woody climber to 30 m (supported) tall and is characterised by whip-like, smooth, warty stems and dark green and glossy, oval-shaped leaves to 10 cm long and 5 cm wide. Leaves are held in pairs on short purplish stems and have prominent thick midribs. Large, showy, funnel-shaped, pink to purple flowers appear in spring and summer and hard, light green fruit pods to 15 cm long and 4 cm wide are produced in summer through to autumn (Parsons and Cuthbertson, 2001).

Native to south-western Madagascar, Rubber Vine can be found in open grasslands and in canopy gaps along streams, in all soil types in eastern Queensland where it smothers native vegetation and restricts access to waterways. Rubber vine is spread by seed in water and by wind (Parsons and Cuthbertson, 2001).

**Balloon Cotton (Gomphocarpus physocarpus)**

*Not Declared (Queensland)*

Balloon Cotton is a sparsely branched shrub to 2 m tall. Latex or white sap obvious when broken. Flowers are white to cream, pendent shaped and arranged in an umbel. Fruits are globular, indented at the tip and form inflated follicles which burst to release plumed wind-dispersed seeds. Native to southern Africa this species has since naturalised in Australia and is commonly found throughout Queensland (JCU, 2010).

**Common Lantana (Lantana camara)**

*Weeds of National Significance (Australia)*
*Class 3 Declared Plant (Queensland)*

Branching, spreading, thicket-forming shrub to 3 m tall with brown, woody, brittle, arching stems that are square in cross-section to 5 m long and 2 – 4 mm diameter with small, recurved prickles. Leaves yellow-green above and paler below, opposite, aromatic when crushed, roughly hairy and ovate to 2 – 10 cm long and 2 – 7 cm wide with prominent veins and variable toothed margins. Flowers are variable in colour from yellow to purple to 2.5 cm diameter and hare held on fine, stiff, hairy, stalks in terminal clusters and fruit are glossy, purple-black clustered drupes to 5 – 8 mm diameter. Flowers and fruits appear year round (Parsons and Cuthbertson, 2001).

Native to Central America, Common Lantana is found in all vegetation types from exposed dry hillsides to wet heavily shaded gullies and predominantly in disturbed areas, in a variety of soils in coastal and sub-coastal regions of eastern Australia, from central and northern New South Wales to central and southern Queensland. Also recorded in north-eastern Northern Territory (Parsons and Cuthbertson, 2001).

Introduced as an ornamental garden plant, this species is dispersed by seeds and possibly suckers and forms dense impenetrable thickets which restrict plant growth, animal and vehicle movement whilst increasing fuel load of vegetation. Plants known to increased soil fertility which facilitates the introduction and spread of other weedy species. May be poisonous to stock (Parsons and Cuthbertson, 2001).
**Common Prickly Pear (Opuntia stricta)**

*Class 2 Declared Plant (Queensland)*

Common Prickly Pear is an erect, succulent shrub to 2 m tall. Stems are dull green to bluish-green, glabrous, fleshy and segmented to 30 cm long, 15 cm wide and 2 cm thick, with tufted areoles containing finely barbed bristles and 1-2 stout, yellow spines to 2-4 cm long. Leaves are reduced to small scales beneath areoles, shedding on maturity. Flowers can be seen late Spring to Summer and appear sessile, lemon-yellow with green or pink markings and fleshy bases on the back to 6-8 cm diameter and are held on margins of stems. Fruit are reddish purple and pear-shaped to 4-6 cm long with tufted areoles. Seeds are yellow to pale brown, numerous and round to 5mm diameter and are embedded in the pulp of fruit. Roots are fibrous and shallow (Parsons and Cuthbertson, 2001).

Native to the Caribbean region, Common Prickly Pear can be found in exposed and shady sites, in semi-arid savannahs and grassy woodlands of warm-temperate, subtropical and tropical regions of Australia, with highest concentrations in central and southern Queensland (Parsons and Cuthbertson, 2001).

Introduced as a garden ornamental this species is highly invasive and drought tolerant. Dispersal is by seed, through animals (ingestion) and by fragmented stems. Thorns may injure humans and livestock (DEEDI, 2010)

**Flannel Weed (Sida cordifolia)**

*Not Declared (Queensland)*

Flannel Weed is an erect perennial subshrub, 50 – 200cm high. Overall the species is densely covered with persistent soft, white stellate hairs giving the plant a felt-like texture. Stems are yellow-green; erect of ascending, 50 – 100cm long, slender and densely hairy. Leaves are yellow-green; alternate, on stout stalks with two equal stipules at the base, oblong-ovate; blades 3.5 – 7.5cm long, 2.5 – 6cm wide, rounded at the apex and hart shaped at the base, with toothed margins. Flowers are dark yellow in colour, often with darker orange centres; solitary or in groups of different ages; calyx 5 – lobed, hairy; corolla 5 – lobed, joined to the staminal tube at the base (Parsons and Cuthbertson, 2001).

Although often considered native to India, Flannel Weed is likely native to all tropical regions, including Australia. This species can be found subtropical and tropical savanna’s of Australia, principally on lighter soils within disturbed environments such as roadsides, cultivated fields and degraded pastures (Parsons and Cuthbertson, 2001).

Considered a serious crop weed, this species often dominated over grazed pastures and is generally unpalatable to stock. A prolific seeder, the seeds are dispersed via attachment to fibrous materials (eg. wool, fur and clothing), irrigation water, fauna ingestion and mud sticking to fauna, machinery and other vehicles (Parsons and Cuthbertson, 2001).

**Alert Weed Species**

**Mimosa Bush (Acacia farnesiana)**

*Not Declared (Queensland)*

Mimosa Bush is a spreading, thicket forming shrub to 4 m tall. Branches grow in a zigzag shape and are usually grey-brown with prominent white spots. Leaves are feathery, green to
yellowish–green, bipinnate into 1 – 7 paired pinnae and 5 – 23 pairs of narrowly, oblong leaflets with spiny appendages at the base. Flowers are bright yellow to orange-yellow and grouped in flower heads of 1 – 3 in the leaf axils and appear irregularly year round. Seedpods are oblong, swollen, black and woody at maturity (Richardson et al, 2006).

Native to tropical America, Mimosa Bush is naturalised in Australia and widespread in Queensland, preferring dry localities, and loamy or sandy soils (DEEDI, 2010).

Mimosa Bush is a fast-spreading weed with the ability to form thorny thickets, particularly along water courses. Able to withstand periods of drought, it is readily eaten by stock, and has good regrowth after grazing (DEEDI, 2010).

**Prickly Acacia (Acacia nilotica subsp. indica)**

*Weeds of National Significance* (Australia)

*Class 2 Declared Plant* (Queensland)

Prickly Acacia is a fast growing shrub or small tree to 9 m tall. Stems are woody and branching, 7 m long and whitish and pubescent when young, becoming darker with age. Leaves are feathery and bipinnate (3–10 paired leaf segments to 3.5–4 cm long, each with 10–25 paired leaflets). Leaflets are linear-oblong to 3–6 mm long and 0.5-0.5 mm wide with paired stout, stipular spines to 5 – 50 mm long at the base of leaves on younger stems. Flowers are globular, bright yellow, fluffy and numerous to 1.2 cm diameter and are held on axillary stalks to 1.5–2 cm long. Seed pods are a distinguishing feature of this species, they appear grey-green, softly hairy, flattened and constricted around the seeds to 6–25 cm long and 1–1.5 cm wide (Parsons and Cuthbertson, 2001).

Native to southern Asia Minor to Burma, Prickly Acacia can be found in semiarid tussock and hummock grasslands, in brown selfmulching soils and principally along streams and bore drains, in northern Queensland and eastern Northern Territory (Parsons and Cuthbertson, 2001).

Introduced to Queensland in the 1980’s primarily for shade and fodder, this species establishes rapidly into dense impenetrable thickets that restrict stock movement and access to water. Spiny thickets can limit access to land, harm livestock and can harbour feral animals. Foliage is palatable to livestock. Dispersal is by seed, through animals (ingestion) (Sainty and Associates, 2009)

**Acacia spp. other than A. nilotica and A. farnesiana**

*Class 1 Declared Plant* (Queensland)

Non-native Acacia species are a group of fast-growing trees or shrubs introduced from Africa and South America. Many have needle-sharp thorns and yellow, spherical, ‘powder puff’ flowers. All are considered to have the potential to become invasive species in Queensland (DEEDI, 2010).

**Sisal Hemp (Agave sisalana)**

*Not Declared* (Queensland)

Sisal Hemp is a tough succulent consisting of a rosette of sword-shaped leaves to about 2 meters tall. Leaves are often rough at the edges and are spine tipped. It has yellowish clusters of flowers on a long central stem which can grow to over 5m. Native to Mexico, Sisal Hemp is a prolific reproducer and can rapidly form dense stands. It out competes native flora, decreasing habitat and biodiversity (Townsville City Council, 2010).
**Alligator Weed (Alternanthera philoxeroides)**

*Weeds of National Significance* (Australia)
*Class 1 Declared Plant* (Queensland)

Alligator Weed is a perennial aquatic herb, with hollow, creeping stems 10 – 70cm long, often forming large densely interwoven mats. Leaves are dark green, opposite, sessile, linear, 2 – 7cm long, 5 – 40mm wide. Leaf blades are fleshy with a waxy surface and conspicuous veins radiating from the midrib. Flowers appear mid-summer to autumn and are silvery white, in cylindrical or subglobular hears 1.2 – 1.4cm diameter. Fruit is brownish, thick skinned and bladder-like. Seeds are ellipsoid and smooth. Roots are short and filamentous in water, rising mainly from the nodes, longer and thicker in soil, often extending below 50cm (Parsons and Cuthbertson, 2001).

Native to South America, Alligator weed can grow under a wide range of conditions on land and water. Optimum growth occurs in fresh water with a high nutrient level with the species thriving in shallow drainage ditches, canals, rivers, lakes, reservoirs, and occasionally inundated pastures. It can tolerate brackish water and, once established on land, will survive extreme dry periods. Currently found in New South Wales it has yet to become established in Queensland (DEEDI, 2010).

In aquatic situations, stems build up into large, interwoven, floating mats. These mats can reach a thickness of up to 1 m and restrict water flow, reduce water quality, out compete native wetland plants and create favourable mosquito habitat. Vegetative fragments are primarily dispersed via water currents and become established at downstream locations. Light sensitive and a high salinity tolerance (Parsons and Cuthbertson, 2001).

**Maderia Vine (Anredera cordifolia)**

*Class 3 Declared Plant* (Queensland)

Maderia Vine is a non-woody climber to 20 m tall. Tubers are produced from aerial and underground stems and are warty, light brown to green and potato-like. Leaves are heart-shaped, alternate, glossy, light green and fleshy to 4-5 cm long with red stalks and wavy margins. Flowers are visible mostly summer to autumn outside tropics and are axillary, small, creamy-white, fragrant and are held in drooping, clustered spikes to 20 cm long (Richardson et al, 2006).

Native to South America, Maderia Vine is found in a broad range of habitats including bushlands, rainforests, coastal vegetation, watercourses, wasteland and other disturbed sites, in coastal regions with high rainfall in eastern Queensland and New South Wales, southern Victoria, northern Tasmania, south-western South Australia and south-western Western Australia (Kleinschmidt et al, 1996)

Introduced as a garden ornamental this species grows vigorously, allowing the plant to readily smother native vegetation. Dispersal is by seed, tubers and spreading root system. Spread by water down watercourses (Sainty and Associates, 2009)

**Bridal Creeper (Asparagus asparagoides)**

*Weeds of National Significance* (Australia)
*Class 2 Declared Plant* (Queensland)

Bridal Creeper is an erect or climbing, somewhat woody, perennial herb to around 3m high. Stems are slender, branching and twining, changing direction at each node. Leaves are
glossy green, solitary, alternate, broadly ovate but sharply pointed. Flowers commences in August of September and appear greenish white, one to several in leaf axils, 8 – 9mm in diameter, on flower stalks bent near the summit. Fruit is a red sticky globose berry, 6 – 10mm in diameter. Seeds are black, shiny, ovoid – globose and 3 – 4mm in diameter. Root is a short thick rhizome giving rise to tuberous roots (Parsons and Cuthbertson, 2001).

Native to South Africa Bridal Creeper can be found in disturbed areas of open woodlands in warm-temperate to tropical regions, preferring fertile, well drained soils of light texture. Although it is not climatically suited to most of Queensland, it has the potential to become a pest in cooler parts of southern Queensland, primarily areas around Stanthorpe and Warwick (DEEDI, 2010).

Introduced as a garden ornamental, this species threatens agricultural production and native species through resource competition. Often forms a thick mat of underground tubers, impeding the root growth of other plants and preventing seedling establishment. Dispersal is primarily through birds who feed on the fruit, seeds are either digested or stick to the birds beak (Parsons and Cuthbertson, 2001).

**Groundsel Bush (Baccharis halimifolia)**

*Class 2 Declared Plant (Queensland)*

Groundsel Bush is a densely branched, erect perennial shrub to 1-2.5 m tall. Stems are green becoming brown and deeply fissured with age, woody and erect. Leaves are dull to pale green, waxy, alternate and broadly wedge-shaped and have toothed margins near the tips to 2.5-5 cm long and 1.2-2.5 cm wide. Flowers, appearing in Autumn, are numerous, cream-yellow and globular to 6 mm diameter or white and are held on terminal clusters. Seed are straw-coloured to brown and ribbed to 3 mm long and are topped with conspicuous pappus of silky hairs to 1-2 cm long. Taproot is deeply branching with numerous fibrous lateral roots (Parsons and Cuthbertson, 2001).

Native to the West Indies and North America Groundsel Bush can be found in open areas, in lowland coastal swamps, degraded pastures and forested areas, usually near water, in a variety of soils including saline, in south-eastern Queensland and north-eastern New South Wales (Parsons and Cuthbertson, 2001).

Introduced as a garden ornamental plant this species is a prolific seeder with the ability to seed all year round in favourable conditions. Groundsel Bush can grow to form dense impenetrable thickets displacing native flora and fauna species and restricting access to waterways. It is toxic to livestock. Dispersal is mostly by wind spread seed. Long distance dispersal can also occur by seeds on animals, in stock feed or in mud on vehicles (Sainty and Associates, 2009).

**Erect Tar Vine (Boerhavia erecta)**

*Not Declared (Queensland)*

Erect Tar Vine is a perennial, erect, branched herb to 1 m tall. Stems are greenish purple, cylindrical, thickened at the nodes and often sticky. Leaves are in opposite pairs of unequal size broadest near base and tapering upward, undulating margins, both sides finely short hairy. Tiny flowers appear year round in heads of 3-9 on stalks in leaf axils and on the ends of stems, constricted around the middle, green and persistent below, upper parts white to pink, 5-lobed, funnel-shaped and falling at maturity. Seeds are club-shaped and longitudinally ribbed (DNRM, 2007).
Native to tropical and subtropical America, Erect Tar Vine is now widespread in Africa, India, Thailand, Indonesia, China, Papua New Guinea and western Polynesia. Not currently present in Australia, however, it has the potential to invade disturbed forests, foreshores and grasslands, roadsides, pastures and annual crops in Queensland as it is highly suited to dry climates and can grow in sandy, nutrient poor soils (AQIS, 2005).

Erect Tar Vine is a fast growing weed that invades crops, degrades the environment and forms dense impenetrable thickets. Seeds are highly sticky and easily attach themselves to clothing, fur, feathers, machinery and vehicles for dispersal (AQIS, 2005).

**Mother of Millions (Bryophyllum delagoense)**

*Class 2 Declared Plant (Queensland)*

Mother of Millions is a perennial herb growing to 1 m high. Stems are erect and cylindrical. Leaves are sessile, succulent, pale green to brown with dark green blotches, cylindrical and notched at the tips to 2-15 cm long. Flowering occurs mainly from winter to spring and they appear drooping, bell-shaped, orange-red to scarlet and 4-lobed to 2-3 cm long and are held in flat top clusters. Fruit are dry and contain many seeds (DEEDI, 2010).

Introduced to Australia as a garden ornamental, from its native Madagascar, Mother of Millions can be found in shady woodlands and along roadsides and in vacant land, in leaf litter and shallow soils, in Queensland (DEEDI, 2010).

This species of plant, particularly its flowers are poisonous to stock. It is dough tolerant. Dispersal is by seed and plantlets produced in notches on the margin of the cylindrical leaves (Sainty and Associates, 2009).

**Fanwort (Cabomba spp. other than C. caroliniana)**

*Class 1 Declared Plant (Queensland)*

Fanworts are a group of perennial aquatic herbs that grow below the water surface with stems up to 10 metres long. Leaves and stems have a thin gelatinous coating, with the leaves being opposite and repeatedly divided to form feathery, fan-shaped structures. The leaves of *C. aquatica* tend to be less finely divided than those of the other species. Flowers are produced above the surface and colour is dependent on species and sub-species, flowers of *C. palaeformis* tend to be white, while *C. aquatica* flowers are yellow and those of *C. furcata*, purple (DEEDI, 2010).

Native to America, Fanworts were originally introduced into Australia as an aquarium plant. This species is an aggressive invader of native freshwater systems, particularly if they are nutrient rich. It outcompetes native freshwater plants due to its rapid growth, allowing it to dominate native vegetation and obstruct creeks, lakes and dams. Dispersal is via vegetative fragments (DEEDI, 2010).

**Saffron Thistle (Carthamus lanatus)**

*Not Declared (Queensland)*

Saffron Thistle is an erect annual herb, to 1 m or more high. Stems are white, yellowish white or very pale green, ribbed, usually with minute hairs or a downy covering, generally a single stem highly branched in the upper half. Leaves are rosette, hairy to downy, 20 cm long, deeply divided with broad terminal lobes, each lobe ending in a short spine. Flowers are yellow or cream with faint red or black veins, individual heads held at the end of branches.
Seed is grey-brown, ovoid, and generally smooth. Root system is a simple unbranched taproot with numerous secondary roots (Parsons and Cuthbertson, 2001).

Native to the Mediterranean region and western Asia, Saffron Thistle occurs in all Australian states and the Northern Territory, particularly in the wheat-growing areas of New South Wales and Victoria. In Queensland it can be found on the Darling Downs and in coastal areas north to the tropics preferring disturbed sites of low fertility (DEEDI, 2010).

Saffron Thistle often occurs in thick patches that can restrict stock movement and cause injury to grazing animals. By competing with pastures this species reduces pasture carrying capacity and crop yields. Dispersal is only via seed largely adhering to clothing, bags, wool, and fur and in mud stuck to equipment and machinery (Parsons and Cuthbertson, 2001).

Yellow Oleander (Casabela thevitia)

Class 3 Declared Plant (Queensland)

Yellow Oleander is a large spreading shrub or small tree growing to 4 m tall. Leaves are alternate, green, discolourous (glossy above and paler below) and more or less lance-shaped, 5.5 to 15 cm long by 0.5 to 1.5 cm wide. Flowers are funnel-shaped, yellow or peach-orange and grouped in clusters at the end of the branches with each flower on a stalk 2 to 4 cm long. Fruit is green (turning black when ripe), lantern shaped, 2.5-4 cm in diameter and contain 1-2 seeds (Australian Government, 2010).

Yellow Oleander invades native vegetation and impacts on the biodiversity of Australian rangelands. All parts of the plant are highly toxic if ingested by humans or grazing animals, particularly the fruit and seeds (Australian Government, 2010).

Mexican Bean Tree (Cecropia spp.)

Class 1 Declared Plant (Queensland)

Mexican Bean Tree is a group of rapidly growing trees, usually to 20 m tall. Bard is smooth and grey. Stems are hollow. Leaves are large and arranged alternately along the stems. Leaf blades are 10–50 cm wide and usually 9–15-lobed. The lobes occasionally have several lateral lobes. The lower surface is very pale to nearly white and silvery and conspicuous from a distance on windy days. Flowers are inconspicuous, yellow, staminate and are arranged in umbellate clusters of spikes 12–18 cm long in clusters of 3–9. Fruit is cylindrical, ovoid to oblong-ovoid, somewhat flattened, 3.3–3.7 mm long, with soft, sweet flesh around many small seeds (DEEDI, 2010).

Native to Central and South America and the West Indies, Mexican Bean Trees have naturalised in parts of Africa, Malaysia and the Pacific. Prefer disturbed sites within rainforests, wherever the forest canopy has been damaged to allow full sunlight onto the forest floor. Not currently naturalised in Australia, however there is potential suitable habitat in the eastern slopes of the Wet Tropics region of North Queensland (DEEDI, 2010).
These species are shade-intolerant, opportunistic, early successional plants that prefer full sun and are quick to colonise disturbed areas. They produce large numbers of seeds that are dispersed by a range of birds and fruit bats (DEEDI, 2010).

**Siam Weed (Chromolaena odorata)**

*Class 1 Declared Plant (Queensland)*

Siam Weed is an erect or sprawling fast-growing shrub to 5 m tall or taller when supported by adjacent plants or objects. Stems are yellowish, slender, sparsely hairy with fine longitudinal lines, succulent at the tips and woody at the base. Leaves are opposite, soft, green, hairy, roughly triangular in shape with a distinctive ‘pitchfork’ three-vein pattern and emit a strong odour when crushed. Flowers are a pale bluish mauve, rarely white, tubular with up to 70 florets grouped into cylindrical to bell-shaped heads. Seeds are dark coloured, 4-5 mm long, narrow and oblong, with a parachute of white hairs which turn brown as the seed dries (Parsons and Cuthbertson, 2001).

Native to Central America, Siam Weed can be found in tropic to subtropic regions, occurring on most soil types in open or partly shaded sites. Currently this species has a very limited distribution in Australia and is confined to a small area in coastal northern Queensland (Australian Government, 2010).

Siam Weed outcompetes and smothers crops and native vegetation; it is allelopathic and toxic to stock. Siam Weed can change the fire regime of infested areas, with fires becoming more frequent and intense. Seeds are dispersed mainly by wind, but can also become lodged in clothing, animal fur and machinery (Australian Government, 2010).

**Bitou Bush (Chrysanthemoides monilifera subsp. rotundata)**

*Weeds of National Significance (Australia)*

*Class 1 Declared Plant (Queensland)*

Bitou Bush is a perennial sprawling shrub, to 3 m high. Stems are woody, highly branched and upper stems are often purplish in colour. Leaves are alternate, 3 – 8cm long, ovate to spatulate, tapering at the base and practically hairless except for a cottony down on young leaves. Flowers are formed in late winter to spring and appear bright yellow and clustered at branch ends. Fruit is initially has green, fleshy skin, becoming black and eventually flaking off to leave a hard, whitish inner coat. Seeds are ovoid, 5 – 7mm long, more or less longitudinally ribbed. Roots are shallow with no distinct taproot (Parsons and Cuthbertson, 2001).

Native to South Africa, this species can now be found in the United States, Sicily, France and New Zealand, but has become a significant problem only to Australia. Preferring subtropical and subhumid scrublands on sand or medium-textured soils, disturbed environments and coastal areas, this species has become an aggressive invader of native bushland in Australia (Parsons and Cuthbertson, 2001).

Introduced to New South Wales in ships ballast, Bitou Bush is a vigorous grower which often out competes native species. A prolific seeder, birds are a major agent of seed dispersal along with water. Able to rapidly regenerate after fire events (Parsons and Cuthbertson, 2001).

**Cholla Cactus (Cylindropuntia spp. and their hybrids, other than C. spinosior, C. fulgida and C. imbricata)**

*Class 1 Declared Plant (Queensland)*
Cholla Cacti are a group of succulent shrubs, generally considered a sudgenus of *Opuntia*. Most have cylindrical to club-shaped jointed segments and shallow widely spreading roots. Areoles also contain spines with a detachable papery sheath, which are very obvious in some species (DEEDI, 2010).

**Koster’s Curse (Clidermia hirta)**

*Class 1 Declared Plant (Queensland)*

Koster’s Curse is a densely branching, long-lived shrub to 0.5-3 m tall, but may reach as much as 5 m in shaded areas. Its branches and leaves are covered in large, stiff, brown or reddish hairs. Leaves are opposite, oval to egg-shaped, 5-18 cm long, 3-8 cm wide, with finely toothed margins and a general wrinkled appearance. They have distinctive veins that run the length of the leaf blade. Flowers are small, bristly and white, occasionally pinkish and are arranged in small clusters in the leaf forks or at the tips of the branches with claw-like stamens. Fruit are globular, hairy berries 4-9 mm in diameter and dark blue, purplish or blackish when ripe (Australian Government, 2010).

Native to tropical America, Koster’s Curse has naturalised in at least 16 countries, including Hawaii, Fiji and Indonesia, preferring humid tropical climates. In Australia it is a potential weed of pastures, roadsides, woodlands and rainforests in humid coastal sites in the Northern Territory and much of northeast Queensland (Australian Government, 2010).

Koster’s Curse is a quick-growing invasive plant that has the ability to form dense thickets, smothering native vegetation and causing major problems to primary industries. The most common method of dispersal is via birds and mammals that ingest the berries, fruit may also be spread by water and human intervention such as in potting material or mud on machinery or vehicles (DEEDI, 2010).

**Thornapple (Datura stramonium)**

*Not Declared (Queensland)*

Thornapple is an annual herb to 1.5 m high. Stems are hairless to sparsely hairy. Leaves 8–36 cm long, ovate to rhombic, margins deeply lobed and toothed. Flowers white to lavender, 6–10 cm long, closing at night and during dull weather. Fruit is a spiny, globular capsule, ovoid to ellipsoid. Seeds are numerous, black or grey, pitted, 2.5–4.5 mm long (Parsons and Cuthbertson, 2001).

Thornapple is of uncertain origin. Preferring warm-temperate and subtropical regions, principally in open warm areas with fertile soils, Thornapples are now widespread throughout all Australian states (Parsons and Cuthbertson, 2001).

All parts of the plant, but particularly the seeds are highly toxic to humans and animals. Strongly competitive with summer crops in Queensland and New South Wales. Dispersal is by seed, particularly by water and as a contaminant in produce (Parsons and Cuthbertson, 2001).

**Anchored Water Hyacinth (Eichhornia azurea)**

*Class 1 Declared Plant (Queensland)*

Anchored water hyacinth is an aquatic plant, native to tropical America. It is closely related, and appears similar to water hyacinth (*Eichhornia crassipes*). Leaves are glossy and round, flowers are purple. Anchored water hyacinth is known to survive either free-floating on the water surface or rooted into the mud. Not currently present in Queensland (DEEDI, 2010).
**Water Hyacinth (Eichornia crassipes)**

Class 2 Declared Plant *(Queensland)*

Water Hyacinth is an erect, free-floating (sometimes attached to the mud and creeping), aquatic perennial herb, varying from 10 cm to 1 m in height where nutrient levels are high. Stems are either erect or horizontal and producing new plants from terminal buds. Leaves are either narrow, erect to 60 cm long or round, upward curved to 30 cm in diameter. Flowers are bluish-purple, funnel shaped with 6 lobes or petals. Fruit is a narrow 3-celled capsual with many longitudinal ribs (Parsons and Cuthbertson, 2001).

Native to the Amazon Basin of South America it is now introduced and widespread as an aquatic weed throughout warm freshwaters of the world. In Australia, Water Hyacinth is most common in coastal areas of eastern Australia from southern Cape York Peninsula, Queensland, to near Kiama, New South Wales (Australian Government, 2010).

Water Hyacinth grows aggressively in nutrient-rich stationary or slow-moving freshwater to quickly form dense mats which rapidly degrade environments. It can block and choke waterbodies, obstruct water flows and interferes with and reduces boating, fishing, swimming and other water recreational activities. Infestations reduce water quality as rotting vegetation reduces the oxygen content and fouls the water, impacting on native plants and animals and making water unfit for drinking by humans and livestock. This species is dispersed vegetatively facilitated by water flows (Australian Government, 2010).

**Horsetails (Equisetum spp.)**

Class 1 Declared Plant *(Queensland)*

Horsetails include about 30 different species in the genus *Equisetum*. They are a group of perennial fern allies with erect, ribbed, hollow, sprawling stems to 1 m high and solid branches in whorls below sheathed nodes rather than from leaf axels. They are primitive plants, many with the appearance of miniature bamboo. Reproduction is by spores, Horsetails do not flower. Currently there are no known wild populations of horsetails in Queensland, however, it is occasionally grown as a garden plant and there is the potential for it to escape cultivation and become a serious pest. (DEEDI, 2010).

**Harissia Cactus (Eriocereus martini)**

Class 2 Declared Plant *(Queensland)*

Harissia Cactus is a spiny, rope-like, night flowering succulent herb, forming large tangled mats 30 – 60 cm high. Stems are bright green, fleshy, jointed at 30 – 45 cm intervals, ribbed lengthways, each rib with six low pyramidal humps crowned with rounded areoles of grey felted hairs, each giving rise to 1 - 3 sharp central spines and 5 – 7 appressed radial spines. Leaves are inconspicuous at the base of the spines. Fruit is red, subglobular 4 – 5 cm in diameter, with several red tubercles topped by cushions of felted hairs and spines on the stems. Fruit splits down one side when ripe to reveal a mass of black seeds embedded in white pulp (Parsons and Cuthbertson, 2001).

Native to South America, Harissia Cactus can be found in Australia on deep fertile cracking clays of the Brigalow forests and false sandalwood scrubs of central and south eastern Queensland (Parsons and Cuthbertson, 2001).

Introduces as an ornamental species, dense infestations of Harissia Cactus choke out pasture. The sharp spines, even in light infestations, make pasture unfavourable to stock and
reducing productivity. The plant fruits prolifically and seeds are dispersed widely by birds and animals. Harrisia cactus can also reproduce by stem sections taking root. A deep, underground, tuberous root system allows the plant to survive catastrophes which may kill the above ground parts (DEEDI, 2010).

**Honey Locust (Gleditsia spp.)**

*Class 1 Declared Plant* (Queensland)

Honey Locust is a deciduous spreading tree to 25 m high. Prolific green leaves, 10 cm long with about 12 opposite paired leaflets, elliptical to ovate, hairless and sparsely toothed. Trunk and limbs of wild trees bear large crucifix like spines, up to 50 mm. Seedpods can be slightly sickle-shaped, compresses with seeds surrounded by a sweet pulp. Seeds are flattened, ovoid, brown to about 10 mm long (Salinty and Associates, 2009).

Native to eastern and central North America, Honey Locust’s can grow in most soil types, especially alluvial flood plains along river systems. In Australia this species can be found forming dense thickets along watercourses on the central coast, western slopes and tablelands of New South Wales and in south eastern Queensland, with heavy infestations occurring on the Darling Downs in the Clifton/Allora area and at Toogoolawah (DEEDI, 2010).

Introduced as an ornamental Honey Locust out-competes and replaces native vegetation and forms dense thickets, particularly along waterways. Provides cover for introduced pests such as foxes, cats and rabbits. Sharp spines can injure humans, wildlife and livestock and damage equipment and vehicles. Dispersal is by seeds spread by animals (ingestion) and water also by suckering (DEEDI, 2010).

**Badhara Bush (Gmelina elliptica)**

*Class 1 Declared Plant* (Queensland)

Badhara Bush is a highly variable thorny shrub or small tree to 2-4 m tall; occasionally up to 10 m. Stems are yellowish or brownish white and armed with paired spines. Leaves are opposite (usually with open of the pair smaller than its companion), ovate and discolours (dark green above and paler below) to 1-10 cm long and 1.5-6 cm wide with pointed tips. Flowers are yellow and tubular to 5 cm long. Fruit is yellow and pear-shaped to 1.5 cm diameter. The timing of flower and fruit events is (DEEDI, 2010).

Native to Asia, one infestation recorded near Rockhampton in coastal central Queensland. Habitat preference is unknown (DEEDI, 2010).

Once established this species can form dense, impenetrable thickets that shade out pasture species, restrict stock movement and decrease native biodiversity. Dispersal is by seeds spread by birds and suckers (DEEDI, 2010).

**Senegal Tea Plant (Gymnocoronis spilanthoides)**

*Class 1 Declared Plant* (Queensland)

Senegal Tea Plant is a freshwater or marsh growing emergent perennial herb which forms rounded bushes or mats of tangled stems. Stems are pale green, erect at first but becoming prostrate, scrambling and branching at the nodes. Leaves are opposite, dark green and ovate to lancelolate with serrate margins. Flowers are in florets, whitish, numerous and grouped into terminal heads. Seeds are yellow-brown and ribbed (Parsons and Cuthbertson, 2001).
Native to tropical and subtropical America, Senegal Tea Plant prefers areas with wet marshy soils and still or very slow flowing waters. In Australia, infestations have been found in New South Wales, Tasmania and Queensland (DEEDI, 2010).

Senegal Tea Plant is an aggressive, invasive plant with stems able to grow up to 15 cm per week. It can form floating mats, blocking irrigation ditches, shallow dams and other waterways and outcompeting native species. Seeds are relatively heavy and not suited to dispersal by wind; rather flowing water and mud stuck to animal hooves are the main agents of spread. Can also be spread via vegetative fragments (Parsons and Cuthbertson, 2001).

**Blue Helitrope (Heliotropium amplexicaule)**

*Not Declared (Queensland)*

Blue Helitrope is a prostrate perennial herb, 15 – 30cm high. Stems are dull green, hairy and highly branched to 1m long. Leaves are dull green, alternate, sessile, oblong-lanceolate, 3 – 7cm long and thickly hairy. Flowers emerge late spring and continue, sporadically throughout summer and appear purple or lilac with a yellow centre, 4 – 5mm long, 5 – 6mm in diameter. Fruit is succulent and more or less globular at first becoming wrinkled wrinkled or tuberculate with age and separating into two nutlets, each with two seeds. Seeds are black, small and globular. Root is a long and slender taproot over 1m with a complex system of laterals (Parsons and Cuthbertson, 2001).

Native to South America, Blue Helitrope is now widespread in south eastern Queensland and northern New South Wales. Preferring warm-temperate and subtropical regions, this species can grow on a variety of soils ranging from sandy red earths through calcareous red soils to deep red volcanic loams. Commonly found in disturbed environments such as roadsides, fallows and degraded pastures (Parsons and Cuthbertson, 2001).

Likely introduced as an ornamental, Blue Helitrope proliferates aggressively due to its high seed output and ready regeneration from vegetative fragments. Recently discovered to be palatable to stock it is also poisonous and deaths are regularly reported. Seed dispersal is primarily via wool and animals fur, water and animal digestion (Parsons and Cuthbertson, 2001).

**Hawkweed (Hieracium spp.)**

*Not Declared (Queensland)*

Hawkweed’s are a group of perennial herbs of variable height, to 90 cm tall. Stems arise from buds near the base of the leaves and have a milky sap when broken. Leaves form a rosette of occasionally 2 to 4 alternate leaves that appear near the base of the upright stem, usually stalkless, hairy on both surfaces, have smooth or slightly toothed margins and are sometimes glandular and ‘sticky’. Flowers are ‘daisy-like’ and may be either solitary or clustered. Colours can be yellow, orange or red (DPI, 2010).

Native to the northern hemisphere, South Africa and the South American Andes, Hawkweeds are not yet widely naturalised in Australia but have potential to be serious weeds in the temperate areas of south-eastern Australia, including the Australian Alps and Tasmanian grasslands (DPI, 2010).

Hawkweeds are highly invasive plants and are a major threat to biodiversity, conservation areas and native grasslands. They can also impact heavily on pastures, roadsides and gardens and are frost-tolerant. Seed dispersal can be via wind, water, machinery, in contaminated fodder, garden waste and soil (DPI, 2010).
**Glush Weed (Hygrophila costata)**

*Class 1 Declared Plant (Queensland)*

Glush Weed is an aquatic and semi-aquatic herb to 1.5 m high. Stems are hairless to shortly hairy with non-glandular hairs. Leaves are opposite, coarse in texture and have prominent veins and a distinct midrib. Seeds are pale brown, round, flattened and about 0.3 mm wide. Flowers can be seen all year round and are white, 10 mm long and with joined sepals below half way (Sainty and Associates, 2009).

Native to Mexico and Argentina, Glush Weed is a significant water weed in northern coastal New South Wales and an emerging problem for waterways in south eastern Queensland, where it displaces native species through its aggressive growth. The species can form mats of dense, floating growth at the edges of freshwater lakes. Dispersal is via seed spread and locally by rooting at nodes (Sainty and Associates, 2009).

**Hymenachne (Hymenachne amplexicaulis)**

*Weeds of National Significance (Australia)*

*Class 2 Declared Plant (Queensland)*

Hymenachne is a robust, rhizomatous, semi-aquatic grass to 2.5 m tall. Plant grows above and below water with roots in ground. Stems are light green and contain pith and form from stolons. Leaves are stem-clasping to 10-45 cm long and 3 cm wide with long hairs and heart-shaped bases. Flowers appear autumn to spring and are held in cylindrical, occasionally branching clusters to 20-40cm long with numerous spikelets. Spikelets are shortly stalked and lance-shaped to 3-5 mm long (Parsons and Cuthbertson, 2001).

Native to South and Central America Hymenachne can be found in permanent water bodies and seasonally inundated wetlands, as well as poor drainage croplands and grasslands, in a variety of soils but usually those that retain moisture well, in north-eastern Queensland and northern Northern Territory (Parsons and Cuthbertson, 2001).

Introduced as a ponded pasture species and is a prolific seeder. It provides high quality feed for stock all year round, even as water bodies dry during extended periods of no rain. Once established Hymenachne can form dense infestations blocking waterways leading to changes in hydrological regimes and flooding, decrease in water quality as encourages anaerobic conditions and reduces native plant diversity and potential habitat areas for fauna species. Potential to contaminate crops such as sugar. Shade intolerant (Parsons and Cuthbertson, 2001).

**Bellyache Bush (Jatropha gossypifolia)**

*Class 2 Declared Plant (Queensland)*

Bellyache Bush is an erect, squat shrub or small tree to 3 m tall. Stems are thick and soft with watery sap to 1-2 m long. Leaves are deep purple and sticky when young and on maturity, bright green, alternate, stalked, rounded to obovate and deeply divided with 3-lanceolate lobes to 10 cm diameter and hairy stalks and margins. Flowers are purple with yellow centres, small and clustered on axillary, branched stalks to 1 cm diameter. Fruit capsules are oblong and 3-lobed to 1.2 cm long and 1 cm wide. Roots are fleshy and tubulous. Flowers and fruits year round but chiefly in Summer and Autumn (Parsons and Cuthbertson, 2001).
Native of tropical Central and South America and the Caribbean Islands this species can be found in disturbed areas including mine sites and rangelands, riverbanks and roadsides, in good loamy soils in northern Australia (Parsons and Cuthbertson, 2001).

Introduced as an ornamental garden species. The shallow roots of the Bellyache Bush inhibit growth of neighbouring plants reducing native vegetation and pasture cover. Seeds are highly toxic to humans and animals (ingestion). Dispersal is through seeds by explosive release and water, and root suckers (Parsons and Cuthbertson, 2001).

**Kochia (Kochia scoparia syn Bassia scoparia)**

*Class 1 Declared Plant* (Queensland)

Kochia is a bushy annual, to 1.5 m tall and wide. Stems are green, with an erect main stem with many upwards-curving side branches. Leaves are up to 50 mm long and 8 mm wide and generally green, but change to yellow, red and brown as the plant ages. Leaves normally have three, but occasionally five, veins running along their length. The flowers are the same colour as the leaves, occurring singly or in pairs, in hairy spikes 5–10 mm long, along the upper parts of the shoots where the leaf and stem join. Seeds are dull brown, 1.5 mm wide and contained in a star-shaped fruit. Roots consist of a main taproot and a network of finer roots (Australian Government, 2010).

Native to Eastern Europe and western Asia, Kochia has become naturalised throughout most of Europe, Argentina, Canada, United States, Africa, New Zealand and parts of temperate Asia including China and Japan. This species thrives in climates with hot, sunny summers and disturbed sites such as roadsides, railways and eroded banks, and also grows in crops, pastures and rangelands. Although not currently found in Queensland it has the potential to become a serious pest if it is ever introduced (Australian Government, 2010).

Originally planted in 1990 for forage and to rehabilitate salt-affected agricultural land in 68 sites in south western Western Australia, this species it had naturalised at 52 of these sites by 1993 and spread to roadsides and pastures and other areas not affected by salt. Dispersal is by seed and vegetative fragments, which can be spread up to several kilometres by wind. Can be toxic to stock if consumed in large quantities (Australian Government, 2010).

**Lagarosiphon (Lagarosiphon major)**

*Class 1 Declared Plant* (Queensland)

Lagarosiphon is a branched, rhizomatous perennial herb which forms large mats of interwoven stems below the water surface. Stems are ascending, hight branched, brittle, to 5 m long and curving downward toward the apex. Leaves are sessile, widely spaced at the base of the stems but crowded together above in a characteristic spiral arrangement with minutely saw-toothed margins. Flowers are unisexual, inconspicuous, purple and are found in the joints of the upper leaves. No fruits or seeds are produced on Lagarosiphon in Australia. Roots are slender, rising from the basal more or less leaf free nodes of the stem (Parsons and Cuthbertson, 2001).

Native to southern Africa, Lagarosiphon prefers temperate regions, occurring in freshwater ponds, lakes, dams and slow moving streams with low turbidity. This species has become naturalised in countries such as New Zealand and some northern European nations, however there are no known infestations in Australia (DEEDI, 2010).

Lagarosiphon growth rate is highly temperature and light sensitive with optimums of 12 hour daylight and 25 degrees. Known to block inlets to water pumping equipment in New Zealand it
can also affect propellers and cooling systems of recreation equipment. Native fish and waterbirds may be affected where the growth becomes dense and restrictive. Dispersal is via vegetative fragments moving through turbulent water and producing advantageous to form new plants (Parsons and Cuthbertson, 2001).

**Creeping Lantana (Lantana montevidensis)**

*Class 3 Declared Plant (Queensland)*

Creeping Lantana is a creeping, trailing or weeping shrub. Stems are slender, 1 m or more long, 1 – 2 mm in diameter and 4-angled at the first but becoming subcylindrical and up to 5 mm diameter with age. Leaves are bright green, opposite, ovate, 2 – 3 cm long, finely toothed at the margins and strongly odours when crushed. Flowers form around November or December and appear light purple in colour with a white or yellow 'eye' when young and are held in groups of about 20 individuals, 2 – 4 cm in diameter. Fruit is green at first, ripening to a single-seeded reddish brown berry, 8 mm in diameter. Root system consists or a brown woody tap root with strong laterals and fine white rootlets (Parsons and Cuthbertson, 2001).

Native to Uruguay and southern Brazil, Creeping Lantana can be found in subhumid to semi-arid regions of the tropics and subtropics, especially on shallow stony soils. In Australia it occurs in coastal and subcoastal Queensland especially in the Burnett and Wide Bay Pastoral Districts, in northern New South Wales and parts of the Sydney region and as an ornamental, in some Northern Territory towns (Parsons and Cuthbertson, 2001).

Creeping Lantana seeds are commonly dispersed by fruit eating animals and birds, also via water flow and mud sticking to clothing and hooves. This species forms dense thickets in grazing areas limiting pasture productivity and is known to rapidly replace pasture species affected by prolonged drought. May be toxic to stock (Parsons and Cuthbertson, 2001).

**Leuceana (Leuceana leucocephala)**

*Not Declared (Queensland)*

Leuceana is a shrub or small tree to 10 m tall. Bark is smooth with prominent lenticels, young branches are finely hairy to hairless. Leaves are about 25 cm long and bipinnate, with dull, greyish-green leaflets. Seedpods are flattened, up to 15 cm long, held in dense clusters and each pod contains about 20 glossy-brown, flat seeds that scatter when ripe. Flowers can be seen in summer and autumn and appear green to whitish with spherical heads and held on short stalks about 5 cm long (DEEDI, 2010).

Native to tropical America, Leuceana has naturalised throughout many areas of the Australian mainland and on a number of offshore islands. Preferring disturbed sites, creek lines and deep well drained slightly acidic to alkaline soils (Sanity and Associates, 2009).

Leuceana was originally introduced to Queensland for fodder, however, unless heavily grazed or otherwise controlled, it is able to rapidly spread to adjacent areas. Know to form dense impenetrable thickets excluding native plants and sheltering feral fauna species. Frost and fire sensitive. Dispersal is via seed spread largely by wind, water, animals (ingestion and movement of contaminates materials and equipment (Sanity and Associates, 2009).

**Limnocharis (Limnocharis flava)**

*Class 1 Declared Plant (Queensland)*

Limnocharis is a perennial herb to 1 m tall. Leaves are broad-ovate, thick, 5 – 30 cm long and 4 – 25 cm wide. Flowers can be seen all year round and appear small, yellow and cup-
shaped. Seeds are dark brown, horseshoe shaped, to 1.5 mm long and with obvious ridges (Sanity and Associates, 2009).

Native to South America, this species can now be found in America and parts of Asia. Prefers saturated, fertile and muddy conditions. Currently, Limnocharis infestations can only be found in northern Queensland however, potential distribution extends to include the coastal regions of the Northern Territory, northern Western Australia and much of eastern Queensland (DEEDI, 2010).

Spread by seed and vegetative fragments in water, this species colonises shallow wetlands and margins of deeper waterways quickly growing to dominate native aquatic plants and affecting the ecology of stream banks by displacing native flora and fauna. Limnocharis can change the hydrology of water bodies. Frost sensitive (DEEDI, 2010).

Peruvian Primrose (*Ludwigia peruviana*)

*Class 1 Declared Plant (Queensland)*

Peruvian Primrose is a small, hairy shrub to 3 m tall. Stems become woody and brittle with age. Leaves are 14 – 12 cm long, alternate and oval to oblong with a narrow stalkless base and prominent veins. Flowers are yellow, usually with four petals, held individually in the upper leaf axils. Sepals turn reddish in fruit, with the capsual egg shaped and four angled (Richardson et al., 2006).

Native to South America, Peruvian Primrose can be found around swamps and in slow-flowing water in the Sydney Region, preferring wetland areas. While it is not known to exist in Queensland, it has the potential to become a serious pest if introduced and planted in aquariums or outdoor ponds. Has the ability to form monocultures that exclude native wetland plants and can form unattached floating mats in deep water (DEEDI, 2010).

Cat’s Claw Creeper (*Macfadyena unguis-cati*)

*Class 3 Declared Plant (Queensland)*

Cat’s Claw Creeper is a woody vine with stems extending for 20 m or more. Leaves comprise of two egg-shaped to elliptic leaflets with a three clawed tendril growing between them. Seeds are contained in long, narrow flat pods. Flowers visible in spring and appear bright yellow and bell shaped. Roots are swollen underground tubers. (DEEDI, 2010).

Native to Brazil and Argentina this species is now widespread and common in coastal summer rainfall areas, north from Sydney and is particularly invasive along coastal and hinterland streams in Queensland and northern New South Wales (Sainty & Associates, 2009).

Cat’s Claw Creeper is an aggressive climber which was introduced as an ornamental in older-style Queensland gardens. This vine has the ability to completely smother native vegetation, including large trees and shrubs, and many bushland areas already have serious infestations of this weed (DEEDI, 2010).

Mikania Vine (*Mikania micrantha*)

*Class 1 Declared Plant (Queensland)*

Mikania Vine is a multi-stemmed perennial vine creeper and climber. Stems are vigorous, slender and ribbed with fine, white hairs. Leaves are heart-shaped, opposite, 4-13 cm long and taper to an acute point. Flowers are white to greenish-white, held on individual flower
heads, 4-6 mm long, and can occur anytime between May and October. Seeds black, 1.5-2 mm long, thin, 5-angled (DEEDI, 2010).

Native to Central and South America, Mikania Vine thrives in humid environments on rich, damp soils, where rainfall exceeds 1000 mm per annum. Considered a serious weed in West Africa through to India, South-East Asia, Indonesia and the Pacific Islands this species has potential distribution in Australia around the coastal regions of the Northern Territory, northern Western Australia, much of eastern Queensland and north-eastern New South Wales (DEEDI, 2010).

Mikania has the potential to be particularly destructive to the Wet Tropics World Heritage areas in Queensland as it has the ability to spread rapidly and smother native vegetation and crops. Vine debris produce toxins that inhibit growth of vegetation, such as native plants and agricultural crops. Dispersal is via seed transported by wind, water, machinery and animals (ingestion), or vegetative fragments which readily produce roots when in contact with moist soils (DEEDI, 2010)

**Giant Sensitive Plant (Mimosa invisa)**

*Class 2 Declared Plant (Queensland)*

Giant Sensitive Plant is an erect, climbing annual or sprawling shrub growing to a height of 2 – 3m. Stems are bunching, profusely branching, often scrambling over other plants, four-angled, the angles usually with a line of sharp, hooked prickles. Leaves are bright green, bipinnate, 10 – 20cm long feathery and fern-like, each leaf divided into five to seven pairs of segments. Each segment carries about twenty pairs that fold together at night or when touched. Flowers are pinkish violet, numerous and in globular heads of about 1 – 3 on individual stalks arising from leaf axils, usually appearing during autumn. Seeds are light brown, glossy, flattened, ovate, 2 – 3 mm long with a horseshoe-shaped ring on each face. Roots consist of a robust branching taproot extending 1 – 2 m with characteristic rhizobial nodules on the root hairs (Parsons and Cuthbertson, 2001).

Native to Brazil, this species is widely spread throughout the wet tropics. In Australia it is now naturalised in the high rainfall areas of coastal north Queensland from Ingham to Cooktown and also around Mackay, preferring highly disturbed areas along roadsides, river banks as well as canfields, plantations and wet pasture lands (DEEDI, 2010).

Fast growing, Giant Sensitive Plant sends out long spiny stems which quickly smother crops, not only reducing yield but also fouling mechanical harvesters. Flowering profusely and producing an abundance of seed, dispersal is mainly via water but also on fur, clothing, machinery and in agricultural materials. Unpalatable to stock and sensitive to shade (Parsons and Cuthbertson, 2001).

**Mimosa Pigra (Mimosa pigra)**

*Weeds of National Significance (Australia)*

*Class 1 Declared Plant (Queensland)*

Mimosa Pigra is a shrub to 5 - 6 m tall. Stems are covered in thorns to 5 – 12 mm long. Leaves are touch-sensitive to 12 – 22 cm long and pinnate (up to 45 pairs of leaflets). Flowers are pink to mauve and globular to 10 – 20 mm diameter. Seed pods are flat, linear and densely hairy to 30 – 120 mm long and 7 – 14 mm wide. Seeds are oblong shaped and brown to olive-green to 4 – 6 mm long and 2 – 3 mm wide. Flowers mid Summer to early Autumn, fruiting shortly after (Australian Government, 2010).
Native to Tropical America Mimosa Pigra can be found in humid and sub-humid tropical regions on riverbanks, coastal plains and floodplains in northern Australia. This species can form dense stands displacing native vegetation especially on wetlands and reduces habitat for native animals. Dispersal is by humans, animals and water (Australian Government, 2010).

**Minconia (Miconia calvescensis)**

*Class 1 Declared Plant (Queensland)*

Minconia is a small tree, up to 15 m tall. Leave are large, deep iridescent purple on the undersides, up to 70 cm long with three large veins on each leaf, running from the base to the tip. Flowers are pink or white, approximately 5 mm long and occur in a large panicle that can contain 1000–3000 individual flowers. Fruit are black to purple when ripe, 6 mm in diameter and contain up to 200 small seeds (DEEDI, 2010).

Native to tropical America, Minconia plants have been found in Far North Queensland, South East Queensland and northern New South Wales. As of January 2007, all active infestations have been contained to north Queensland (DEEDI, 2010).

Minconia is an aggressively growing tree with the ability to invade rainforest areas, displace native plant species and affect the habitat of native fauna. The ecosystems at risk are primarily the coastal tropical and sub-tropical rainforests of eastern Australia. This species also has the potential to degrade crop, plantation and pasture areas. An attractive garden plant Minconia has spread as a garden escape, mainly facilitated by birds (ingestion) (DEEDI, 2010).

**Candleberry Myrth (Myrica faya)**

*Class 1 Declared Plant (Queensland)*

Candleberry Myrth is a fast-growing shrub up to 15 m tall, with the potential to out compete native vegetation. A major weed in Hawaii, Candleberry Myrth is not known to exist in Queensland, however, it has the potential to become a serious pest if introduced and planted in gardens (DEEDI, 2010).

**Eurasian Milfoil (Myriophyllum spicatum)**

*Class 1 Declared Plant (Queensland)*

Eurasian Milfoil is a submered perennial herb, commonly found in waters up to 3 m deep. Stems are reddish-brown to whitish-pink in colour, hairless, slender growing to 7 m long and 5 mm thick and branch profusely near the surface to form a dense canopy. Leaves are olive-green in colour, less than 4 cm long and feather-like, arranged around the stem in whorls of four and have 5–24 pairs of divisions. Flowers are small, pinkish, occurring in whorls of four around the stem. They are held above the water in an erect spike up to 8 cm tall but then lie parallel to the water surface once fruit sets (DPI, 2010).

Native to Europe, Asia and northern Africa, this species is now naturalised in Canada and America. Preferring lakes, ponds, shallow reservoirs and slow moving water, Eurasian Milfoil will grow in fast moving water and is known to tolerate and thrive in a range of temperatures and water conditions, including low levels of salinity (DPI, 2010).

Eurasian Milfoil is highly aggressive and can spread rapidly forming dense cover that shades out and replaces all other aquatic plants, seriously affecting native plant and animal life. Dense mats also interfere with water sports and irrigation. Dispersal is mainly via vegetative
fragments which are spread over long distances by water currents and between water bodies by boating and fishing activities (DPI, 2010).

**Chilean Needle Grass (Nassella neesiana)**

*Weeds of National Significance (Australia)*  
*Class 1 Declared Plant (Queensland)*

Chilean Needle Grass is a tufted perennial tussock grass to 1 m high. Leaves are 1-5 mm wide, flat and strongly ribbed on their upper surface and rough at the edges. Seedhead grows to 40 cm long; lemma (excluding corona) to 1 cm long, hard point at the base of lemma with hairs; awns are pale green and twice bent, 4 – 9 cm long. Flowers spring to summer with flowers appearing dark red when new (Sainty & Associates, 2009).

Native to South America, Chilean Needle Grass is now a major agricultural and environmental weed in New South Wales and Victoria. In these areas it can be found along roadsides, in pasture, grassland, open bushland and disturbed sites and along creeks. Small infestations have been recorded in Darling Downs region of Queensland and this species has potential to spread further into southern Queensland (Sainty & Associates, 2009).

Dispersal is via the spread of seeds by mainly human assisted methods (eg. Adhering to clothing, livestock vehicles, machinery) but also via wind and floodwaters. Heavy infestations of this species displace desirable pasture species and the productivity of infested pastures in southern states has decreased by as much as 50%. The long sharp seeds can cause injury to animals and downgrade lamb and sheep meat, wool, skins and hides. Chilean Needle Grass reduces biodiversity by replacing native species within native grasslands, grassy woodlands and riparian areas. It tolerates drought, heavy grazing and periodic inundation (DEEDI, 2010).

**Mexican Feather Grass (Nassella tenuissima)**

*Class 1 Declared Plant (Queensland)*

Mexican Feather Grass is a densely tufted perennial tussock grass to 70 cm tall. Leaves are thread-like, 0.25-0.5 mm in diameter, about 60 cm long. Seed heads are pale, 15-25 cm long, lower glume is 9-10 mm long (DEEDI, 2010).

Native to Chile, Argentina, New Mexico and Texas, Mexican Feather Grass prefers dry, temperate climates, in open woodlands areas. Although not currently naturalised in Australia individuals of this species have been found in Victorian and New South Wales nurseries and in 2008 four individuals were found in Brisbane suburbs. It is a low protein high fibre grass with no grazing value and has the potential to render grazing pastures in southern Queensland worthless. Seeds can be dispersed by flooding, vehicles, on clothing and the fur of pets and can remain viable for up to four years (DEEDI, 2010).

**Serrated Tussock (Nassella trichotoma)**

*Weeds of National Significance (Australia)*  
*Class 1 Declared Plant (Queensland)*

Serrated Tussock is a perennial tussock-forming grass, to 50 cm high. Stems can be up to twice as long as the leaves, erect initially but drooping at maturity and highly branched. Leaves are numerous, rolled giving an almost cylindrical cross-section, to 50 cm long, finely serrated. Inflorescences an opened branched pinicle to 35 cm long with small and inconspicuous florets. Seeds are very numerous, around 2 mm long, each with tuft of white
silky hairs at the base. Plants have a distinct purple appearance when flowering and golden colour when seeds are ripening (Parsons and Cuthbertson, 2001).

Native to South America, Serrated Tussock can be found mainly in the tablelands of New South Wales and the Australian Capital Territory, and in several locations in Victoria and Tasmania, where it is not restricted by soil type, rainfall pattern but potentially limited by hot summers (DEEDI, 2010).

Serrated tussock has no grazing value because of its high fibre and low protein content. Infestations result in a significant loss in livestock production, and dense infestations may completely dominate pasture, making large areas incapable of supporting livestock. Seed dispersal is mainly by wind, but also by human and animal activity (Australian Government, 2010).

Water Mimosa (Neptunia oleracea and N. plena)

Class 1 Declared Plant (Queensland)

Water Mimosa is a free-floating perennial, aquatic weed. Stems are rarely branched to 1.5 m long. Leaves are bipinnate with 2-3 9-4 pairs of pinnae. Flowers are bright yellow and ball-shaped. Seeds are brown to 4-5mm long (DNRM, 2008).

Native of tropical Asia, Africa and South America Water Mimosa can be found along banks of watercourses, canals, ponds and swamps in native range and recorded in south-eastern Queensland (DNRM, 2008). Cultivated as a vegetable this species forms dense mats which lead to changes in hydrology and water quality. Dispersal is by seed and stem cuttings (DNRM, 2008).

Velvet Tree Pear (Opuntia tomentosa)

Class 2 Declared Plant (Queensland)

Velvet Tree is an erect shrub or small tree to 8 m tall. Stem segments are dull green, flattened, oblong to narrowly elliptic, 15 to 30 cm long and 1.5 to 2 cm thick with a velvety texture. Areoles are scattered, prominently raised, sometimes with up to 4 weak spines and yellow glochids. Flowers are orange, 4 to 5.5 cm in diameter with purplish tinged outer segments. Fruit is red to purple, velvety and egg-shaped to globose, depressed at the apex and 2.5 to 5 cm in diameter (Australian government, 2010).

Native to central Mexico, Velvet Tree Pear is now widespread throughout the brigalow belt of Queensland where it is still extending its range. It also occurs in scattered locations in New South Wales and South Australia in Acacia or mallee systems in drier semi arid or arid parts (Australian government, 2010).

Similarly to other Opuntia species, Velvet Tree Pear can form dense infestations can impede movement and lay waste to agricultural and pastoral land, provide harbour for feral animals and crowd out native plant species. The spines and glochids can cause injury to humans and animals. Dispersal is via vegetative fragments which root when in contact with the soil or are spread by becoming attached to animals, footwear and vehicles. They are also dispersed by birds and animals ingesting the fruits (Australian government, 2010).

Parkinsonia (Parkinsonia aculeata)

Weeds of National Significance (Australia)

Class 2 Declared Plant (Queensland)
Parkinsonia is a single or multi-stemmed shrub to 8 m tall. Stems are smooth, green, slender, drooping and zig-zag. Leaves are pinnate and held on flat, green stalks to 30 cm long and 2-3 mm wide. Leaflets are numerous and staggered on stalk, small, green and oblong to 4-10 mm long with sharp, recurved spines to 5-15 mm long at leaf bases. Flowers are visible from winter to summer and have 4 yellow petals and 1 erect, orange or orange-spotted petal. Seed pods are straight, straw-brown and constricted around the seeds to 3-13 cm long, with pointed tips. Seeds are olive-green to brown and oblong-shaped to 10 mm long and 4 mm wide. Roots are shallow (Parsons and Cuthbertson, 2001).

Native to tropical America Parkinsonia can be found in moist, sub-humid tropics to arid environments, along watercourses including drainage lines, dams, rivers and bores, in predominantly clay soils but also found in a variety of soil types, in coastal, central and western Queensland, central and northern Northern Territory and northern and central Western Australia (Parsons and Cuthbertson, 2001).

Introduced as an ornamental plant and shade tree the spices displaces native vegetation and reduces access to land and waterways, decreasing grazing land and providing refuge for feral animals. Infestations may lead to increased erosion and lowering of watertables. Not palatable to stock. Prolific seeder and dispersal is mainly by seeds in water or mud on animals and machinery (Parsons and Cuthbertson, 2001).

**Parthenium Weed (Parthenium hysterophorus)**

*Weeds of National Significance (Australia)*
*Class 2 Declared Plant (Queensland)*

Parthenium Weed is a Chrysanthemum-like, erect, aromatic herb to shrub to 5 m tall. Stems are erect and branching in the upper half, with longitudinal grooves and becoming woody with age. Leaves are alternate, pale green and shortly hairy. Rosette leaves are deeply lobe to 8-20 cm long and 4-5 cm wide. Stem leaves are shorter and less divided with ultimate segments bluntly pointed or rounded. Flowers appear all year round and are white and compact to 4-10 mm diameter, with 5 distinct corners and are held in terminal panicles. Seeds are black and flattened to 2 mm long with 2 thin white spoon-shaped appendages at the tips. Taproot is deeply penetrating with many finely branched feeding roots (Parsons and Cuthbertson, 2001).

Native to North and South America Parthenium Weed can be found in disturbed areas including roadsides, railway reserves, stockyards, cultivated fields, disused pastures and vacant lots, in heavily fertile soils, particularly alkaline clay loams and black clay soils, in humid to sub-humid tropical and sub-tropical regions of Queensland and northern and central New South Wales (Sainty and Associates, 2009).

Thought to be introduced with aircraft and machinery during parts of World War II this species is known to reduce pasture productivity and is toxic to cattle (ingestion). Parthenium Weed ingestion can also taint meat from livestock grazing on plants. Reduces biodiversity in native grasslands by out-competing with and displacing (alleopathic) native species. Species is a prolific seeder with a large, persistent seed bank and long seed dormancy. Dispersal by seed, on machinery and animals and in stock feed and water (Parsons and Cuthbertson, 2001).

**Buffel Grass (Pennisetum ciliare)**

*Not Declared (Queensland)*
Buffel Grass is a perennial tussock grass to 90cm. Leaves are bluish green, flat, and taper to a fine point. Seed heads can vary in colour from white to shades of purple, depending on the variety. Prolific seeder (CSIRO, 1995).

Native to North Africa and the Middle East, Buffel Grass is now widespread throughout the Northern Territory, prefers sandier and sandy loam soils. It is considered a valuable pasture grass and it is palatable to stock. It can tolerate heavy grazing, periods of drought and fire events. Buffel grass is an environmental weed, invading areas previously occupied by native grasses, wildflowers and small plants around Alice Springs and already dominates large parts of the landscape around Alice Springs (CSIRO, 1995).

**Lippia (Phyla canescens)**

*Not Declared (Queensland)*

Lippia is a fast-growing, mat-forming and prostrate perennial herb to 30 cm tall. Stems are green to purple in colour when young and becoming grey and woody with age. Leaves are greyish to green, finely hairy, in pairs at stem nodes and rounded 10-20 mm long and 3-7 mm wide. Flowers are white to purple, held in clusters on long stems arising from leaf axils. Fruits are 1-1.5 mm in diameter and release two tiny brown, oval, flattened seeds at maturity (Australian Government, 2010).

Origin of this species is not clear. In Australia Lippia infestations can be found in South Australia, Victoria, New South Wales, Western Australia and Queensland, preferring temperate and sub-tropical areas and a wide variety of soil types in open, seasonally wetted areas and along edges of water bodies (Australian Government, 2010).

Lippia can tolerate drought, frost and long periods of rain. It readily establishes on bare ground and has the ability to take over large areas of land along waterways and adjacent higher ground. Dispersal is by both seed and vegetative fragments. Vegetative material breaks off the main plant during flooding events and can remain dormant until suitable environmental conditions occur (DEEDI, 2010).

**Spiked Pepper (Piper aduncum)**

*Not Declared (Queensland)*

Spiked Pepper is a fast growing small tree to 7 m tall. Grown as an ornamental plant but regarded as a weed due to its ability to rapidly invade pastures and native landscapes, including disturbed rainforests. Native to the West Indies and tropical America, this species is now established in Florida, Southeast Asia, Papua New Guinea and a number of Pacific Islands. Not currently present in Australia. Dispersal is via birds, fruit bats and animals (ingestion) (AQIS, 2005).

**Water Lettuce (Pistia stratoites)**

*Class 2 Declared Plant (Queensland)*

Water Lettuce is an aquatic, free floating herb to 20 cm tall (above water). Leaves are wedge-shaped, pale green, ribbed, spongy, velvety with a lettuce-like appearance and buoyant towards the base to 15 cm long and 8cm wide. Flower heads are small and partly concealed at the plant base. Flowers appear in spring and are held on a column surrounded by a whitish, slit funnel-shaped bract. Fruit consists of small berries 6 mm in diameter. Seeds are oblong to 2 mm long. Roots are stoloniferous, tufted and feather to 80 cm long (Parsons and Cuthbertson, 2001).
Native to Asia, Africa, equatorial America and considered Native in the Northern Territory, Australia this species is considered introduced to Queensland, New South Wales and Western Australia. Found in slow or stationary streams as well as mud banks and other damp situations such as roadside culverts, in areas of southern Australia (Sainty and Associates, 2009).

Introduced as an aquarium and water garden plant Water Lettuce has since naturalised in the Northern Territory. In nutrient-rich waters, this species can rapidly reproduce, expanding infested areas and forming obstructive mats which restrict water flow and reduce water quality in rivers, dams and irrigation canals. Heavy infestations pose a drowning risk to children and livestock if they become entangled and may cause damage to structures and interfere with available drinking water for stock. Species is known to harbour disease-causing mosquitoes (Parsons and Cuthbertson, 2001).

**Madras Thorn (Pithecellobium dulce)**

*Class 1 Declared Plant (Queensland)*

Madras thorn (also known as Manila tamarind) is a large fast-growing tree to 20 m tall. The trunk is spiny with greyish bark, becoming rough and furrowed with age. Leaves consist of two pairs of relatively large leaflets, 20-40 mm long, asymmetric, oblong or egg-shaped in outline and each leaf stalk bears a pair of short, sharp spines, 2-15 mm long, at the base. Flowers are greenish-white, turning yellowish with age, fragrant and held in dense globular clusters about 10 mm across. Seedpods are irregularly swollen, strongly twisted or coiled, and have a pinkish hue. The pods contain a white pulp and 5-12 reddish-brown to black seeds (Australian Government, 2010).

Native to North, central and South America Madras Thorn has not yet become naturalised on the Australian mainland. However, it is a potential weed of pastures, open woodlands, rangelands, roadsides, disturbed sites and waste areas in drier tropical and subtropical environments with the ability to grow on poor soils in dry climates and along coastlines, including areas where its roots are in brackish or salt water (Australian Government, 2010).

Madras Thorn has the potential to invade pastures and out-competes desirable species including native vegetation and forms dense impenetrable thickets. It could spread quickly across vast tracts of tropical and subtropical areas to become a costly weed of agriculture and the environment. Its sap can cause eye irritation and skin welts. Dispersal is largely via animals and birds through seed ingestion (Australian Government, 2010).

**Castor Oil Plant (Ricinus communis)**

*Not Declared (Queensland)*

Castor Oil Plant is a spreading robust shrub to 3 m tall and occasionally taller. Stems are a dull pale green tinged with red, glabrous, stout, hollow and branching, usually 1 to 2 m long. Young leaves are a glossy dark red to reddish brown developing into a glossy green when mature. Mature leaves are alternate, rounded, 15 – 30 cm across, occasionally to 60 cm on stalks attached to the lower surface away from the leaf margin. The shield shaped leaf blade is palmately divided into 7 to 9 lanceolate toothed lobes each with a prominent midvein radiating from the point of attachment of the leaf stalk; leaves have a nauseating odour when crushed. Flowers commence in December and continue through until March and are reddish green, unisexual and held in terminal clusters or at the leaf stem junction, upper flowers female, lower flowers male. Fruit is a reddish green, ovoid softly spiny capsule 1 to 3 cm in
diameter, consisting of three segments each containing one seed. Seed is mottled silvery and brown and smooth. Roots are thick and fibrous (Parsons and Cuthbertson, 2001).

Native to Africa and Euro-Asia, Castor Oil Plant has been introduced to most countries of the world. Commonly found along gullies, watercourses and roadsides in warm-temperate and subtropical regions. Naturalised in all Australian states except Tasmania. (Parsons and Cuthbertson, 2001).

Introduced to Australia during early settlement, the seed pods of the Castor Oil Plant explode violently when ripe spreading the seeds over several meters, however, the most important means of spread is man’s commercial activities in growing the plant for its oil. Seeds contain the toxin \textit{ricin} and highly toxic to humans and animals, although leaves are considered unpalatable and unlikely to be eaten by stock. This species thrives during periods of high rainfall also is drought tolerant, but sensitive to frosts (Sainty and Associates, 2009).

\textbf{Salvinia (Salvinia spp.)}

\textbf{Salvinia molesta}

\textit{Weeds of National Significance} (Australia)
\textit{Class 2 Declared Plant} (Queensland)

\textbf{Salvinia spp. other than Salvinia molesta}

\textit{Class 1 Declared Plant} (Queensland)

Salvinia is a genus of free-floating, mat-forming, rooted, aquatic ferns. Stems are slender, jointed and branched to 30 cm long and 1-2 mm diameter. Leaves are pinnate. Submerged leaves are brown and deeply divided with hairy stalks and groups of hairy, unbranched root-like filaments to 2-2.5 cm long at the ends of leaf stalks. Emerged leaves are green, broadly ovate or 2-lobed, shortly stalked and wavy above with egg-beater like structures with smooth margins. Emerged leaves have primary, secondary and tertiary invading stages. Primary invading leaves are small, flat and ovate to 1-1.5 cm wide. Secondary invading leaves are crowded, folding and boat-shaped to 2.5 cm wide. Tertiary invading leaves are crowded, deeply notched and tightly folded upwards along the midrib to 6 cm wide. Spores are pimply, sterile and shortly stalked and are held in racemes along filaments of submerged leaves (Parsons and Cuthbertson, 2001).

Native of South America Salvinia can be found in still or slow-moving, fresh to slightly brackish waters, in watercourses, reservoirs and inundated croplands in coastal regions of northern and eastern Australia, south-western Western Australia and isolated areas of Victoria (Parsons and Cuthbertson, 2001).

Introduced as an aquarium plant species this species reproduces vegetatively in nutrient rich situations. Salvinia can tolerate short periods of dry, however it has a low salt tolerance. A prolific grower, this species chokes wetlands and lakes, creating anaerobic conditions which lead to a decrease in water and fauna habitat quality and displaces fish and invertebrates. Dense infestations may change hydrological regimes and increase flooding frequency. Dispersal is by fragments of viable stems (Parsons and Cuthbertson, 2001).

\textbf{Red Sesbania (Sesbania punicea)}

\textit{Class 1 Declared Plant} (Queensland)

Red Sesbania is a deciduous shrub or small tree to 4 m tall. Stems are slender and numerous. Leaves are drooping and compound to 10-20 cm long with 10-40 paired leaflets.
Leaflets are dark green, paired and oblong with pointed tips. Flowers are showy, pea-shaped and red to orange to 2-3 cm long, held in dense spikes to 25 cm long and appear in summer. Fruit pods are brown, longitudinally four-winged and oblong to 6-8 cm long and 1 cm wide with pointed tips (Sainty and Associates, 2009).

Native to South America, Red Sesbania is not known to occur in Queensland but may potentially spread as an ornamental species to infest creek and river banks and in areas that are frequently inundated with water. A prolific seeder with seed dormancy period this species is also water sensitive and has the ability to form dense infestations. Poisonous to animals (DEEDI, 2010).

**Broad-leaved Pepper Tree (Schinus terebinthifolius)**

*Class 3 Declared Plant* (Queensland)

Broad-leaved Pepper Tree is a large spreading trees up to 10 m high. Leaves are broad, opposite and consist of 5-9 dark-green leaflets. Flowers are small whitish flowers grow at the end of branches between September to November. Fruits are held in bunches and are glossy, round, bright red and 6 mm across. Not all trees bear fruit (DEEDI, 2010).

Native to Brazil, the broadleaved pepper tree is a garden escapee that is invading coastal dune lands, wetlands and stream banks of New South Wales and Queensland. This species out competes native plants and harbours a disease fatal to mangroves. Contains a resin which is toxic to humans and animals (DEEDI, 2010).

**Easter Cassia (Senna pendula var. glabrata)**

*Not Declared (Queensland)*

Easter Cassia is a spreading shrub to 3 m tall. Leaves are erect, with 3 – 6 pairs of broadly oblong leaflets with rounded tips and prominent yellowish margins and topside of the leaf stalk has a gland between the lowermost leaflets. Flowers appear around Easter and are bright yellow with two or three stamens protruding. Flowering is followed by hundreds of brown, slender seed pods up to 12 cm long and each containing 5–10 seeds (Richardson et al, 2006).

Native to South America this species is now common in Brisbane gardens and is naturalised in highly disturbed urban bushland and farmland in many areas of south east Queensland and northern New South Wales. It is frequently seen along roadsides and on the banks of waterways (DEEDI, 2010).

**Singapore Daisy (Sphagneticola trilobata)**

*Class 3 Declared Plant* (Queensland)

Singapore Daisy is a mat-forming perennial herb to 70 cm tall. Stems to 2 m or more long. Leaves are lush, glossy green, usually 3-lobed and in pairs along the stem. Flowers are solitary in leaf axils, yellow to orange-yellow, daisy-like, 2 cm wide. Seeds are 4 – 5 mm long, tuberculate and topped with short scales (Sainty and Associates, 2009).

Native to Mexico and Argentina, Singapore Daisy is now common along the coast of Queensland, in tropical and sub-tropical areas and spreading in coastal areas of New South Wales and the Northern Territory (Sainty and Associates, 2009).
Introduced as a garden ornamental, this species spreads rapidly smothering seedlings, ferns and shrubs. Dispersal is mainly by cuttings from slashing and pruning, but also via seeds (DEEDI, 2010).

**Paramatta Grass (Sporobolus africanus)**

*Class 2 Declared Plant (Queensland)*

Paramatta Grass is a tufted grass to 50 cm tall. Stems are dark green, erect and slender to 15-50 cm tall. Leaves are dark green, mostly basal, rolled, slender and stiff to 6-18 cm tall. Inflorescences are dense, spike-like panicles to 6-20 cm long and 4-7 mm diameter with 2-2.5 mm long. Seeds are brown and subglobose to 1 mm diameter, and appear in spring. Roots are fibrous (Parsons and Cuthbertson, 2001).

Native to South Africa Paramatta Grass is found in moister areas in disturbed areas in roadsides, pastures and waste places, particularly wet or swampy areas, in all Australian states except Tasmania (DEEDI, 2010)

Paramatta Grass is a perennial species and aggressive grower. Tough and unpalatable species which can reduce pasture production and displace native grasses. Prolific seeder and dispersed by seed, on fur and machinery, and in water (DEEDI, 2010).

**Giant Rat’s Tail Grass (Sporobolus natalensis)**

*Class 2 Declared Plant (Queensland)*

Giant Rat’s Tail Grass is a robust, tufted, tussock-forming grass to 1.7 m tall. Leaves are green, folded or rolled and hairless to 1.3 m tall with glabrous sheath. Inflorescences are 40 cm long and 3 cm wide and are held on slender stems, giving a rat’s tail appearance when young, becoming more elongated pyramid-shaped on maturity. Seeds are orange-brown and tapered-cylindrical to 1 mm long. Roots are fibrous (Botanic Gardens Trust, 2010).

Native to Africa, Giant Rat’s Tail Grass can be found in a broad range of habitats, on a wide variety of soils, in eastern Australia, from northern New South Wales to Queensland (DEEDI, 2010).

Introduced as a contaminant in pasture seed, Giant Rat’s Tail Grass is a perennial species and prolific seeder with large seed bank and long seed dormancy. Dense infestations can reduce pasture productivity and displace native grasses. Not palatable to stock. This species is a fire hazard when dry and recovers rapidly from fire events. Dispersal is by seed, on fur, skin, vehicles and machinery and in water. (Sainty and Associates, 2009).

**Witch Weed (Striga spp. other than native species)**

*Class 1 Declared Plant (Queensland)*

Witchweeds are upright, annual, herbs growing to about 40 cm high although some species reach about 1 m. Stems are green, square in cross-section, covered with rough hairs or bristles. Leaves are green, small, lance shaped and roughly textured, with the lower leaves arranged in opposite pairs along the stem, while the upper ones are alternate. Flowers are on short stalks, or are sessile, and are borne near the tips of the stems in clusters 10-15 cm long Colour varies among species and can be yellow, white, orange, purple, pink or red. All species are parasitic (Australian Government, 2010).

Native to tropical and subtropical regions in Asia and Africa, exotic Witch Weeds are not currently found in Australia (Australian Government, 2010).
Witch Weeds can infest a wide range of grass crops including maize, millet, rice, sorghum, and sugarcane, as well as some broadleaf plant crops and infestation can significantly reduce yields. Symptoms of parasitism by Witch Weed species can be difficult to distinguish from those caused by drought, such as wilting, curling of leaves, stunted growth and a pronounced ‘burnt’ appearance to leaf edges. Dispersal is via numerous tiny seeds that can be dispersed by wind, water, farm machinery and contaminate agricultural produce (Australian Government, 2010).

**American Rat’s Tail Grass (Sporobolus indicus var. pyramidalis)**

*(syn. S. Jacquemontii / S. pyramidalis)*

*Class 2 Declared Plant (Queensland)*

American Rat’s Tail Grass are a group of robust, tufted, tussock-forming grass to 50-75 cm tall. Leaves are green, folded or rolled and hairless to 50 cm tall with glabrous sheath. Inflorescences are 25 cm long and 0.5-3 cm wide and are held on slender stems, giving a rat’s tail appearance when young, becoming more elongated pyramid-shaped on maturity. Seeds are orange-brown and tapered-cylindrical to 1 mm long. Roots are fibrous (DEEDI, 2010).

Native to America, American Rat’s Tail Grass can be found in a broad range of habitats, on a wide variety of soils, in coastal areas of eastern Queensland (JCU, 2010).

Introduced as a contaminant in pasture seed, American Rat’s Tail Grass is a perennial species and prolific seeder with large seed bank and long seed dormancy. Dense infestations can reduce pasture productivity and displace native grasses. Not palatable to stock. This species is a fire hazard when dry and recovers rapidly from fire events. Dispersal is by seed, on fur, skin, vehicles and machinery and in water. (Sainty and Associates, 2009).

**Floating Chestnut (Trapa spp.)**

*Class 1 Declared Plant (Queensland)*

Floating Chestnut’s are floating aquatic plants with triangular shaped leaves and hard, sharp seed pods. Native to South-East Asia they have the potential to be introduced and to become serious pests in Queensland’s lakes, dams and reservoirs (DEEDI, 2010).

**Annual Thunbergia (Thunbergia annua)**

*Class 1 Declared Plant (Queensland)*

Annual Thunbergia is an erect, annual herb growing up to 35cm high. Unlike many other species of Thunbergia, Annual Thunbergia is not a climbing vine. Leaves are smooth and opposite. Flower colour is unknown. Native to arid parts of northern Africa, this species degrades creek and river banks and is considered a major threat to remnant vegetation in the wet tropics. Not currently found in Australia, however, it has the potential to spread across tropical and subtropical areas of Australia including Queensland (DEEDI, 2010).

**Fragrant Thunbergia (Thunbergia fragrans)**

*Class 1 Declared Plant (Queensland)*

Fragrant Thunbergia is a twining vine with triangular-ovate, opposite leaves 5 - 10 cm long. Leaf margins are entire to finely toothed and blade ovate to arrowhead-shaped. Flowers are white; 3 cm long by 5 cm wide and have a sweet aroma. Seed capsules are round and end in a beak. Native to South-East Asia Fragrant Thunbergia has been found in numerous coastal
areas in Queensland and has the potential to spread across tropical and subtropical areas of Australia. This species threatens remnant vegetation in the wet tropics and degrades creek and river banks (DEEDI, 2010).

**Laurel Clockvine (Thunbergia laurifolia)**

*Class 1 Declared Plant (Queensland)*

Laurel Clockvine is a perennial climbing vine with narrow, oval, pointed tip leaves, 10 cm long by 15 cm wide which grow in opposite pairs. Seed capsules brown, 1 cm long by 4 cm wide containing two to four seeds with a hollow inner surface. Flowers are large, trumpet-shaped and blue. Roots are tuberous and can resprout. Native to India and Malaysia this species was introduced as a garden ornamental and is now widespread in low elevation, moist environments in Queensland. Laurel Clockvine is a major threat to remnant vegetation in the wet tropics as it climbs native vegetation, smothering, shading out and killing the understorey, and often pulling down mature trees with its weight. Disperses via vegetative fragments spread by floodwater (DEEDI, 2010).

**Gorse (Ullex europaeus)**

*Weeds of National Significance (Australia)*

*Class 1 Declared Plant (Queensland)*

Gorse is an erect, highly branched shrub to 4 m high. Young stems are green, developing to brown in older growth, woody when mature, longitudinally ridged, hairy and armed with numerous spines to 5 cm long. Leaves are dark green, narrow, spine-like, 1 – 3 cm long, hairy and occur in clusters more of less uniformly spaced along the branches and branchlets. Flowers can be seen often year round but mainly late winter to spring and autumn and appear bright yellow, pea-like and fragrant. Fruit is a dark coloured ovoid pod, 1 – 2 cm long and densely hairy. Seed is green to brown, smooth, shiny, about 3 mm long and somewhat triangular in shape with straw coloured appendages (Parsons and Cuthberton, 2001).

Native to central and western Europe, Gorse is considered a major weed in New Zealand, Chile and the western states of America. In Australia Gorse occurs in all states, except the Northern Territory, preferring heathlands, hillsides and embankments in temperate regions free from severe frosts and principally non-calcareous soils (Parsons and Cuthberton, 2001).

Dense stands of Gorse are highly flammable, particularly on days of low humidity. Thickets provide cover for rabbits and limit stock grazing. Prolific seeder, seeds are the only method of spread, which occurs mainly via birds, insects and materials. Seeds are relatively large and not equipped for wind dispersal (Parsons and Cuthberton, 2001).

**Noogoora Burr (Xanthium occidentale)**

*Not Declared (Queensland)*

Noogoora Burr is an erect annual herb to 2.5m tall. Stems are purple and blotched. Leaves are dark green on upper surface, 15 cm in diameter and roughly textured with minute bristles. Flowers are inconspicuous, in leaf axils towards the end of the branches, developing into hard, woody, spiny burrs, 1.2 cm to 2 cm long with hooked spines (DEEDI, 2010).

Native to America, Noogoora Burr is widespread in Queensland, occurring in tropical, central and west regions, preferring alluvial floodplains. This species is a competitor to pasture and summer crops. Seedlings are poisonous to stock if eaten in sufficient quantities. Dispersed via burrs that attach to animals and clothing (DEEDI, 2010).
**Chinee Apple (Ziziphus mauritiana)**

*Class 2 Declared Plant (Queensland)*

Chinee Apple is a thorny, densely branched and spreading tree to 6 m tall and 10 m in diameter with zigzag stems with a leaf and thorn at each joint. Leaves are glossy green above and white to rusty, hairy below, alternate and elliptical but asymmetrical at the base to 3.2-6 cm long and 3.8-5 cm wide, with toothed margins (Parsons and Cuthbertson, 2001).

Native to east Africa, the Indian Ocean islands and southern Asia, Chinee Apple is found in a broad range of habitats from forested and riparian areas to waste places and degraded pastures, in subhumid to semi-arid tropical and subtropical regions with a distinct dry season in northern Australia. Chinee Apple is spread by seed, through birds and animals (ingestion) and sometimes by water (Parsons and Cuthbertson, 2001).

Introduced as an ornamental plant, this species forms dense, impenetrable thickets that reduce available grazing land, interfere with stock movement and limit access to water. Thorns may injure livestock and humans. Frost sensitive but drought, waterlogging and salt tolerant (Parsons and Cuthbertson, 2001).

**Christ’s Thorn (Ziziphus spina-christi)**

*Class 1 Declared Plant (Queensland)*

Christ’s Thorn is a spiny shrub 3 – 10 m tall. This species propagates from seeds held within woody capsules. Native to dry areas of northern Africa, Christ’s Thorn is not currently present in Queensland. Once established, it is known to form dense impenetrable thickets, displacing native vegetation (DEEDI, 2010).
References and Information Sources


Department of Natural Resources and Mines (DNRM). 2008. Pest Plant Risk Assessment, Water mimosa (Neptunia oleracea) and Dead and Awake (Neptunia plena). DNRM, Brisbane.


Appendix 2  Alert Plant Disease Profiles
Alert Diseases - Profiles

Black Sigatoka (Mycosphaerella fijiensis)

Exotic Pest (Queensland)
Notifiable under the Plant Protection Regulation 2002

Black Sigatoka is a fungal leaf spot disease of bananas. Early symptoms are narrow, rusty, reddish-brown lesions which appear as streaks on the underside of leaves. These become dark brown or black spots on both surfaces, and develop yellow margins and grey centers. In an advanced stage of the disease, the plant will have mostly dead leaves and fruit bunches that have poorly filled fingers that ripen unevenly (DEEDI, 2010).

Black Sigatoka is present in all major banana-producing regions of the world. The disease is widespread in countries to Australia's north, including Papua New Guinea, and is found on several outer islands of the Torres Strait. It has also occurred at five locations on Cape York Peninsula (i.e. Bamaga, Pascoe River, Bloomfield River, Weipa and Daintree) since 1983. In April 2001, it was found for the first time in a commercial production area near Tully in North Queensland, but has since been eradicated (DAFF, 2010).

Black Sigatoka is spread by fungal spores carried in the wind. The spores can infect all parts of the banana plant including leaves, suckers used for planting as well as leaf litter, which in turn can contaminate fruit shipments. It results in the eventual death of infected leaves; reducing fruit yield and making the fruit ripen prematurely. Overseas, growers control Black Sigatoka with much higher doses of pesticides than are currently used in Australia. This is harmful to the environment and greatly raises the price of bananas (DEEDI, 2010).

Branched Broomrape (Orobanche ramose)

Exotic Pest (Queensland)
Identified as a quarantine concern by AQIS

Branched Broomrape is a parasitic plant that attacks the roots of broad-leafed crop and native flora species. A wide range of crops are attacked including pulses, pasture legumes, oilseeds and vegetables. It is an upright, fleshy weed lacking green parts (no chlorophyll), and often densely hairy with minute glandular hairs 0.2-0.7 mm long, particularly on the flowers and upper parts of the stems, but sometimes almost hairless. Stems are erect, 5 to 30 cm high (commonly under 20 cm), single or many, irregularly curved, slender, often much branched from just above ground level, brown or straw-yellow in colour. The few leaves appear triangular dark brown or purplish scales, arranged alternately on the stem, sparse, mainly near the base of the plant. Flowers are pale blue and numerous; arranged along upright spikes up to 15 cm long that terminate the branched stems. Roots are thick, fleshy, and short and attached to the host plant (Faithfull and McLaren, 2004).

Native to Europe, North Africa and the Middle East, Branched Broomrape has been introduced to the USA, Cuba, Central America, Argentina and South Africa. This species is currently present in Australia, with restricted distribution in the Murray Bridge area of South Australia. Most commonly found in alkaline soils, soils with low nitrogen and free draining soil types (DAFF, 2010).

Branched Broomrape is spread via seed dispersal, mainly carried by vehicles and machinery, but also by animal, wind and water vectors. Broomrapes attach to the roots of the host via a specially adapted root system and deprive it of nutrients and water. They severely affect the
physiology of the host plant, reducing its carbohydrate and protein content. Results in a serious reduction in crop yield (30 – 70%) (Faithfull and McLaren, 2004).

**Banana Bunchy Top (Banana bunchy top virus)**

*Emerging Pest (Queensland)*

*Notifiable under the Plant Protection Regulation 2002*

Banana Bunchy Top is caused by a virus that infects banana plant tissue, producing dark green, dot-dash flecks running along leaf veins and hooking down along the midrib, and dark green streaks running vertically down the leaf sheath into the pseudostem of the banana plant. New emerging leaves are progressively shorter, narrower and more erect (DEEDI, 2010).

Bunchy top is already present in Australia and a serious outbreak in the 1920s devastated the Queensland banana industry in the 1920s. It can be found in the southern areas of Queensland and northern New South Wales (DEEDI, 2010).

The disease is spread either on infected planting material or by the banana aphid, *Pentalonia nigronervosa*. It is currently under several control programs to prevent its spread to North Queensland. Affected plants do not produce fruit, and constrains plantation production. Infected plants cannot be cured and must be destroyed (DEEDI, 2010).

**Citrus Canker (Xanthomonas axonopodis)**

*Exotic Pest (Queensland)*

*Notifiable under the Plant Protection Regulation 2002*

Citrus canker is a bacterial disease of citrus trees including grapefruit, lemons, limes and oranges caused by the bacteria *Xanthomonas axonopodis pathovar citri*. Symptoms include the presence of raised lesions on the leaves, fruits and stems of the plant, caused by the bacterium entering the plant tissue. Lesions are usually tan to brown in colour, surrounded by an oily, water-soaked margin and a yellow ring or halo. Large or older lesions may have a crater-like appearance. Symptoms are often most noticeable on leaves as leaf tissue offers more opportunity for infection (DEEDI, 2010).

Widespread in many tropical and subtropical citrus growing areas of the world and common in Indonesia and Papua New Guinea, Citrus canker is most severe in hot, wet areas. Previous outbreaks of this disease have been eradicated from Queensland and the Northern Territory and the disease is currently not established in Australia (DAFF, 2010).

Spread locally over a single plant occurs when wet, as lesions ooze bacterial cells, which leads to the infection of new sites on the plant. Dispersal over short distances is commonly via water splash caused by rain or overhead irrigation systems. Spread over longer distances can occur during severe weather events where strong winds and rain are present and by movement of contaminated equipment, vehicles, tools, gardening equipment or people (hands, shoes and clothing). Citrus canker can spread quickly and has the potential to devastate Australia’s healthy citrus industry. It reduces the growth of new fruit and spoils healthy fruit (DEEDI, 2010).
**Citrus Greening (Huanglongbing) (Candidatus Liberobacter spp.)**

*Exotic Pest* (Queensland)

*Notifiable under the Plant Protection Regulation 2002*

Citrus Greening is caused by the bacterium *Candidatus Liberobacter spp.* which invades citrus plant conducting tissue. Symptoms appear similar to those of a nutrient deficiency and the disease can be difficult to identify. Infected trees turn yellow, with blotchy, mottled leaves. Fruit are small, lopsided, tend to remain mostly green even when mature and are bitter. Advanced or chronically infected trees show yellowing of the entire canopy with sparse foliage and severe twig dieback (DEEDI, 2010).

Citrus greening is suspected to originate in China. It currently affects citrus production in India, Asia, South-East Asia (including Indonesia and the Philippines), the Arabian Peninsula, and Africa. The bacterium is not present in Australia (DEEDI, 2010).

The disease is spread by psyllid insects or contaminated grafting material. Two psyllid insects are important vectors of the disease. *Diaphorina citri* is found in Asia and *Trioza erytreae* is found in Africa. *D. citri*, is the insect of most concern to Australia due to its proximity and known tolerance to warm climates. Once a tree has become infected there is no existing cure, infection leads to eventual plant death (DAFF, 2010).

**Eucalyptus/Guava Rust (Puccinia psidii)**

*Identified as a quarantine concern by AQIS*

Eucalyptus Rust (also known as Guava Rust) is caused by the fungus *Puccinia psidii* and affects members of the Myrtaceae family. Native Australian plants known to be susceptible to the disease include eucalyptus (Eucalyptus and Corymbia), bottlebrush (Callistemon) and paperbark (Melaleuca). First signs of infection can be found on the shoots and leaves and appear as tiny raised spots or pustules on infected tissue; after a few days’ pustules turn a distinctive egg-yolk yellow. Plants eventually shrivel, leaves become deformed and infection can cause heavy defoliation, stunted growth and death (AQIS, 2005).

Native to parts of South America, the fungus has spread to North America (Mexico and Florida) and parts of Central America including the Caribbean. The fungus is not currently present in Australia (AQIS, 2005).

Eucalyptus Rust can be easily spread by the dispersal of fungal spores by wind and by attachment of spores to human clothing and luggage. It could also enter Australia by infected seeds, nursery stock, bark crevices, lumber and wood packaging material. If brought to Australia, it could have a devastating effect on Australian ecosystems (AQIS, 2005).

**Grapevine Leaf Rust (Phakopsora euvitis)**

*Exotic Pest* (Queensland)

*Notifiable under the Plant Protection Regulation 2002*

Grapevine leaf rust (GLR) is a disease of grapevines caused by the fungus, *Phakopsora euvitis*. Symptoms often include angular, brown spots on the top side of the leaf where the tissue has died. Clustered, small, yellow, powder fungal spores also appear on the underside of mature leaves. Infestation may eventually lead to weakening of the vine and defoliation (DEEDI, 2010).
GLR is widespread in Asia and common in Central America. It was detected for the first time in Australia in Darwin, the Northern Territory, in 2001 and was subject to a successful State Government eradication program between 2003 and 2007 (Moore and Daly, 2009).

GLR is spread through the wind-borne dispersal of fungal spores and the movement of infested plant material. Vines can be infected all year round, but is most noticeable in the dry season. The disease causes premature defoliation during the growing season, resulting in poor shoot growth and a reduction in quantity and quality of fruit, impacting on agricultural production. GLR is endemic in South-East Asian countries, which are in close proximity to northern Australia, there is a risk the disease could be re-introduced (Moore and Daly, 2009).

Karnal Bunt (Tilletia indica)

*Identified as a quarantine concern by AQIS*

Karnal Bunt is primarily a disease of wheat caused by the fungus *Tilletia indica*. Symptoms are difficult to detect in the field, as only a few seeds on each wheat head are infected. However, in sever cases the fungus can be readily seen and smelt in the harvested grain. All or part of the grain is replaced with a powdery mass of dark spores that emit a strong, fishy odour (AQIS, 2005).

Karnal Bunt was first detected in northern India and has since spread within India and to Pakistan, Afghanistan, Nepal, Iraq, Iran, Mexico, South Africa and southern and eastern parts of the United States. It prefers cool, humid conditions. The fungus is not currently present in Australia (AQIS, 2005).

Long distance dispersal of fungal spores is primarily via wind, when the infected grains are disturbed during harvesting. Spores can survive in soil or stored seed for up to five years. Australia has suitable conditions for Karnal Bunt and it could have a major economic impact on national wheat production. The greatest risk to Australia is through the importation of soil and agricultural machinery potentially harbouring viable spores (AQIS, 2005).

Mango Malformation Disease (Fusarium mangiferae and other *Fusarium* spp.)

*Exotic Pest (Queensland)*

*Notifiable under the Plant Protection Regulation 2002*

Mango Malformation Disease (MMD) is a fungal disease of mangos caused by one or more species of the fungus *Fusarium*. Mango trees (*Mangifera indica*) are the only known host of disease. Common signs of infection are abnormal, compact growth of shoots and flowers. Growing points such as leaf and stem buds produce misshapen shoots with short internodes and brittle leaves. The leaves are significantly smaller than those of healthy plants and re-curve towards the stem. Affected flower stems or panicles are thickened and highly branched and produce abnormally high quantities of flowers which are enlarged, sterile and do not bear fruit (DEEDI, 2010).

MMD has been reported in Africa, the Americas, and Asia and in late 2007 it was detected for the first time in Australia in a mango plantation near Darwin. The plantation was felled and burnt and the disease is now considered under official control (Biosecurity Australia, 2008).

The disease is mainly spread via infected plant material. Infection is thought to be facilitated by the mango bud mite, *Aceria mangiferae*, which creates wounds on the plant during feeding activity. MMD causes abnormal flower and leaf development, resulting in reduced plant growth and fruit yield, impacting on agricultural output (DEEDI, 2010).
**Myrtle Rust (Uredo rangelii)**  
*Exotic Pest (Queensland)*

Myrtle rust is a serious fungal disease caused by *Uredo rangelii* that affects plants in the Myrtaceae family. In Australia, it has been identified so far on Agonis, Callistemon and Syncarpia species; however, the exact host range is not yet known. To date, it has not been confirmed on Australian eucalypts. First signs of infection are distinctive yellow lesions on young, actively growing leaves, shoots tips and young stems. In severe cases, lesions enlarge and coalesce. Leaves may become buckled or twisted as a result of infection (DEEDI, 2010).

As of September 2010, Myrtle Rust has been confirmed on fourteen sites in New South Wales extending from inland of Gosford to just north of Wollongong. It is unknown where the fungus originated from or how it entered Australia (Gollnow *et al.*, 2010).

Dispersal of fungal spores can occur via wind, water splash, insects, equipment and human clothing. The disease can also spread through cuttings, plants and cut stems from infected plants. The fungus spores can survive on stock plants for up to 3 months in the environment, if conditions are favourable. Myrtle Rust can result in deformation of leaves, heavy defoliation of branches, dieback, stunted growth and eventual plant death and could have a devastating effect on Australian ecosystems (Gollnow *et al.*, 2010).

**Panama Disease (Fusarium spp.)**

*Exotic Pest (Queensland)*  
*Notifiable under the Plant Protection Regulation 2002*

Panama Disease (also known as Fusarium Wilt), is a disease of bananas caused by the *Fusarium* wilt fungus. The fungus infects the roots of the banana plant, limiting its water supply. The first symptoms are yellowing and dying of the leaf edges, often mistaken for effects of water stress, with the leaves eventually collapsing. Internally, the water conducting tissue is discoloured (DEEDI, 2010).

The closest known location of Panama Disease to Australia’s north is Indonesia. It is currently found in areas of Queensland and the Northern Territory (DEEDI, 2010).

The disease is primarily spread by moving infected planting material (suckers), which can appear healthy on the outside. It can also be moved in very small quantities of soil. Effects range from reduced yields to death of the plants. The soil remains infested indefinitely and production of susceptible banana varieties such as Cavendish bananas must cease in infected regions. This results in a reduction in fruit supply, affecting the market value of the fruit and income for growers (DAFF, 2010).

**Papaya Ringspot (Virus type P (PRSV-P))**

*Emerging Pest (Queensland)*

Papaya Ringspot is a viral disease which infects both papaya and cucurbits (eg. Squash, pumpkin, cucumber and watermelon). Early symptom include a yellowing and vein-clearing of the young leaves, yellow mottling of the leaves and possible severe blistering and leaf distortion in later stages. Dark-green streaks and rings also appear in the leaf stalks and stems. Infected fruits exhibit visible dark green concentric rings and spots or C-shaped markings. Symptoms persist on the ripe fruit as darker orange-brown rings (DEEDI, 2010).

Papaya Ringspot occurs in most countries where the crop is grown including Hawaii, Taiwan, Brazil, Thailand, the Caribbean islands and the Philippines. The disease was first found in
Australia in 1991, in south east Queensland and remains fairly common in backyards of northern Brisbane. It has not been found in central or northern Queensland (DEEDI, 2010).

The virus can be spread by both a variety of aphid species and infected seedlings. Papaya Ringspot is not spread by other insects and it does not survive in soil or dead plant material. Vigour of trees and fruit is usually reduced depending on the age of the plant when infected. Fruit quality, particularly flavour, is adversely affected and it is considered a serious threat to the papaya industry (DEEDI, 2010).

**Pine Pitch Canker (Fusarium circinatum)**

*Identified as a quarantine concern by AQIS*

Pine Pitch Canker is caused by the fungus *Fusarium circinatum* and affects pine species and Douglas fir. The fungus causes bleeding infections on tree branches leading to wilting, fading of needles on branch tips and copious amounts of resin at or near infection site. Needles become yellow, then red and fall from branches. Infected wood is slightly sunken and honey coloured. Trees can suffer crown dieback or death of the individual. It can also infect the tree’s reproductive structures, killing female flowers and mature cones (DAFF, 2010).

Thought to have originated in Mexico Pine Pitch Canker can be found in the United States, South Africa, Haiti, Japan and Spain. The fungus is not currently present in Australia (AQIS, 2005).

The disease is spread by the dispersal of fungal spores primarily in wind, fog or rain. The fungus can enter the tree or seedling through wound areas caused by weather damage or insects or through the roots. The fungus remains viable in wood for over a year. Pine Pitch Canker has caused severe damage in native stands and plantations of *Pinus radiata* in California and could pose a significant economic threat to the *Pinus* and *Pseudotsuga* plantations in Australia (AQIS, 2005).

**Plum Pox**

*Exotic Pest (Queensland)*  
*Identified as a quarantine concern by AQIS*  
*Notifiable under the Plant Protection Regulation 2002*

Plum Pox virus, also known as sharka, affects all *Prunus* species, including the cultivated stonefruits plum, peach, nectarine and apricot. It also affects a range of weed hosts such as white clover and nightshade. Symptoms are varied and dependent on the host species, locality and season. Leaf symptoms are often subtle and include diffuse or blurred pale green or occasionally yellow rings, lines or spots. The most obvious symptoms can be seen on the fruit, particularly on plum, and include the development of discoloured rings, spots, or bands on the skin, external pitting, grooving, or deformation of the fruit, as well as internal flesh discolouration and marking on the stone (DEEDI, 2010).

First discovered in Bulgaria in 1917, the virus has since spread through most of Europe and to Turkey, Syria, Egypt, India, the United Kingdom and parts of the United States, Canada and South America. It is suspected that over 100 million trees are currently infected in Europe alone. The virus is not currently present in Australia (AQIS, 2005).

Over short distances the virus is spread by small sucking insects, such as aphids. Over longer distances spread is via human movement of infected plant parts. Plum pox can be extremely damaging to fruit production. Tree yields can be severely affected and up to 100% premature fruit drop has been reported in some plum varieties. Infected fruit are generally
unmarketable due to unsightly appearance, low sugar content, poor flavour and short shelf life. If introduced and established to Australia it is considered that Plum Pox would have a devastating effect on stone fruit industries (AQIS, 2005).

**Sugarcane Smut (Ustilago scitaminea Sydow)**

*Emerging Pest (Queensland)*

*Notifiable under the Plant Protection Regulation 2002*

Sugarcane Smut is a disease of sugarcane caused by the fungus *Ustilago scitaminea*. Symptoms include the development of a black, whip-like structure that forms from the growing point of the sugarcane plant. Before the whip forms, there is some shortening and crinkling of the youngest leaves (DEEDI, 2010).

Sugarcane smut was first detected in Queensland in Childers in 2006. It has since spread through sugarcane producing areas in Queensland including Mackay and Ingham, and the disease is now regarded as established and widespread in Queensland (DEEDI, 2010).

The whip-like structure contains a thin membrane which breaks to release a large volume of fungal spores that can be spread by wind or carried on clothing and machinery. Sugarcane Smut is considered highly infectious and can reduce crop yields by 30 – 100% (DEEDI, 2010).

**Tomato Leaf Curl Virus (Gaminivirus family)**

*Emerging Pest (Queensland)*

Tomato Leaf Curl Virus (TLCV) is a constantly evolving virus affecting tomato plants. Infected plants appear stunted or dwarfed. Leaflets are rolled upwards, inwards and are slightly chlorotic. Adult leaves are often bent downwards and are stiff, thicker than normal, have a leathery texture and can have a purple tinge to the veins on the under side. Fruit, if produced at all, are small, dry and unsaleable (DEEDI, 2010).

TLCV is restricted to the northern parts of Queensland and the Northern Territory. The southern-most detection in Queensland has been in Mossman. It can be found worldwide in tropical and subtropical regions (DEEDI, 2010).

The virus lives in infected plants, some of which may be weed plants that do not show symptoms and is transmitted between plants by silverleaf white fly, *Bemisia tabaci* biotype B, which is a horticultural pest in coastal and some inland districts of Queensland and New South Wales. In affected areas, control of TLCV epidemics will depend on control of whitefly infestations. It is not transmitted in seed, soil or from plant to plant by handling (DEEDI, 2010).

**Tomato Yellow Leaf Curl Virus (Gaminivirus family)**

*Emerging Pest (Queensland)*

Tomato Yellow Leaf Curl Virus (TYLCV) is caused by viruses in the *Geminivirus* family of plant viruses, which are spread by whiteflies. This virus is distinct from Tomato Leaf Curl Virus. Infected plants appear stunted or dwarfed. Leaflets are rolled upwards, inwards and are slightly chlorotic. Adult leaves are often bent downwards and are stiff, thicker than normal have a leathery texture, show interveinal chlorosis and are wrinkled. Fruit, if produced at all, are small, dry and unsaleable (DEEDI, 2010).

In 2006, TYLCV was found in cherry tomato crops in the south western periphery of Brisbane. Since then, it has rapidly spread to Bundaberg Lockyer Valley, Fassifern Valley, Esk, Caboolture and Redlands areas (DEEDI, 2010).
Similarly to TLCV, TYLCV lives in infected plants, some of which may be weed plants that do not show symptoms and is transmitted exclusively by silverleaf white fly, *Bemisia tabaci* biotype B, which is a horticultural pest in coastal and some inland districts of Queensland and New South Wales. In affected areas, control of TLCV epidemics will depend on control of whitefly infestations. It is not transmitted in seed, soil or from plant to plant by handling (DEEDI, 2010).
References and Information Sources


Appendix 3  Weed Hygiene Declaration Form
Part 1 – Sale or supply of things

(Examples of ‘thing’ include fodder, grain, seed, livestock, gravel, sand, soil, mulch, packing material, machinery, vehicles, or water)

This declaration is valid for supplying thing/things specified below from _______ to _______ (please provide dates)

1. Thing (please tick the relevant box and provide a brief description)
   - [ ] Fodder
   - [ ] Grain/seeds
   - [ ] Sand/gravel
   - [ ] Machinery
   - [ ] Mulch
   - [ ] Livestock
   - [ ] Other

   Amount ____________________________ (e.g. weight, size of load, number of items)

   Description ____________________________ (e.g. cattle, hay, dozer)

2. Has the ‘thing’ been moved through, stored in, come from, or used in a place infested with:

   [ ] Yes
   [ ] No
   [ ] Maybe

   Parthenium
   [ ]
   Giant rat’s tail grass, American rat’s tail grass, giant Parramatta grass, Parramatta grass
   [ ]
   Prickly acacia
   [ ]
   Other (provide details)

   [ ]

3. If you answered ‘yes’ or ‘maybe’ in question 2, then what actions have been taken to remove or ensure that there is no reproductive material (please tick the relevant boxes and specify steps taken)
   - [ ] Nil
   - [ ] Washing/cleaning
   - [ ] Quarantine period
   - [ ] Chemical treatment
   - [ ] Certified clean
   - [ ] Other

   Steps taken ____________________________

4. To the best of my knowledge the ‘thing’ described above: still contains a weed listed in 2 above
   - [ ] Yes
   - [ ] No
   - [ ] Maybe

I ________________________________________ of ________________

State ________________ Telephone ________________

I declare that the information that I have provided in this declaration is true and correct and I have read the accompanying explanatory notes before completing this Declaration.

Signature ____________________________ Date ____________________________

Part 2 – Transport of contaminated things

(Vehicle includes anything used for carrying anything or any person by land, water or air, and includes equipment or machinery capable of moving on land).

This declaration is valid for transport and movement of vehicles and other things from _______ to _______ (please provide locations)

1. Movement of vehicles. The vehicle described as:

   Make ____________________________

   Registration no. or engine/frame no. ____________________________

   Was *clean prior to entry to ____________________________ (destination)

   *Please refer to the definition of clean in the explanatory notes

2. Transport of contaminated things. If you are transporting anything contaminated or possibly contaminated with any declared weed, what actions are being used to contain the weed reproductive material:

   - [ ] Nil
   - [ ] Covered with tarpaulin
   - [ ] Enclosed within container
   - [ ] Chemically treated
   - [ ] Other

   Actions: ____________________________________________

   [ ]*

I ________________________________________ of ________________

State ________________ Telephone ________________

*If same as Part 1 please write ‘as above’

I declare that the information that I have provided in this declaration is true and correct and I have read the accompanying explanatory notes before completing this Declaration.

Signature ____________________________ Date ____________________________
Explanatory notes

This declaration was developed in response to landholders, rural industry, community and government desire to minimise the impact of weeds on their business and on the environment. It has been developed to assist in preventing the spread of weeds and other contaminants, and to meet the requirements of Section 45 of the Land Protection Act (Pest and Stock Route Management) Act 2002. Completed it provides information on the status of a ‘thing’, whether it is contaminated or free of weedy material. Part 1 – Sale or Supply of Things of the declaration should be completed by the supplier then given to the receiver before they receive the ‘thing’. The receiver can then make an informed decision and take precautions to prevent new infestations. It can also provide written assurance that a vehicle is clean before entering a property.

Why use this declaration?
This declaration can provide:
• A supplier a way of meeting the requirements of section 45 (2) of the Act, if they are supplying any thing that is, or could be contaminated with the weeds listed below.
• A person obtaining a ‘thing’, information on whether the thing is clean of weed reproductive material or has been infested.
• Assurance that a vehicle was “clean prior to entry onto a property.
• Assurance that any contaminated or potentially contaminated thing is being moved so as not to spread the contaminant.
• Assurance that a product is free of other weedy reproductive material.

Section 45 of the Act makes it an offence to supply a ‘thing’ that is contaminated with a Class 1 or any of the Class 2 weeds listed below. However, for the Class 2 weeds, a person does not breach Section 45, if they provide a written notice (Part 1 of this declaration) that states that the ‘thing’ is or may be contaminated. The written notice must be filled and given to the receiver before the ‘thing’ is supplied.

List of Class 2 species
The following class 2 pests are prescribed for section 45(1)(b) of the Act. These weeds are readily able to infest a wide range of products, from livestock to grain and vehicles. These weeds have a major effect on pasture production and have the capacity to invade large areas of Queensland.

<table>
<thead>
<tr>
<th>Common name</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>American rat’s tail grass</td>
<td><em>Sporobolus Jacquemontii</em></td>
</tr>
<tr>
<td>Giant Parramatta grass</td>
<td><em>Sporobolus fertilis</em></td>
</tr>
<tr>
<td>Giant rat’s tail grass</td>
<td><em>Sporobolus pyramidalis</em> and <em>S. natalensis</em></td>
</tr>
<tr>
<td>Parramatta grass</td>
<td><em>Sporobolus africanus</em></td>
</tr>
<tr>
<td>Parthenium</td>
<td><em>Parthenium hysterophorus</em></td>
</tr>
<tr>
<td>Prickly acacia</td>
<td><em>Acacia nilotica</em></td>
</tr>
</tbody>
</table>

Across Queensland, isolated outbreaks of declared plants such as those listed above are found on properties and roadsides each year. Outbreaks of these declared plants are often located hundreds of kilometres from core infestations. These outbreaks occur as a result of machinery, livestock, vehicles, fodder, grain, material and equipment contaminated with weed seeds being transported across the state. A high percentage of seed from prickly acacia and giant rats tail grass remains viable after being eaten and excreted by cattle.

*Definitions
Clean
• For vehicles, machinery and equipment, clean means that no soil and/or, organic matter that may contain weed reproductive material, is on or in areas that are accessible during cleaning and maintenance work. A checklist and guidelines that show areas that are required to be clean are located on www.dpi.qld.gov.au.
• A vehicle is considered to remain clean if it leaves its point of origin clean and only travels on sealed roads or well maintained unsealed roads.
• For livestock, clean means that animals are internally and externally free of the reproductive material of any declared plant listed in the Land Protection (Pest and Stock Route Management) Regulation 2003. If livestock are suspected to be infested with a declared weed then they should be quarantined within a weed free paddock or pen for a 14-day period.

Weed reproductive material: means any part of the plant that is capable of producing another plant, this can be by sexual and asexual reproduction. Examples include seeds, bulbs, rhizomes, tuber, stem or leaf cutting and the whole plant.

Well-maintained unsealed road: means roads that do not have vegetation growing on or encroaching onto the area occupied by traffic.

For further information: Please contact the relevant Local Government Weeds Officer or the local office of the Department of Primary Industries and Fisheries.
Appendix 4  Weed Washdown Guidelines
Vehicle Washdown Procedure

The following vehicle washdown procedure has been developed from the Queensland Checklist for Cleandown Procedures (DNR, 2000) and should be undertaken at an approved washdown facility (Calliope). The following should be used as a guideline only:

- Place vehicle/machine in a safe position - stable and immobile.
- Stop engine, apply park brake, chock wheels and lower all implements or secure/chock them if they are required up for cleaning (e.g. slasher).
- Ensure the area is free of obstructions / objects that may cause injury (logs, powerlines etc).
- Examine the item for cleaning to determine extent of mud, dust and plant material build up.
- Identify any points that require specific attention eg behind guards and protective plates, radiators, spare tyres etc these may be difficult to locate and access.
- Remove necessary guards/belly plates to access areas for cleaning.
- Identify areas that may require cleaning with compressed air rather than water. Do these first.
- Clean under guards and underneath machinery / vehicle and then do the cabin, upper body and implements.
- Tool boxes and storage compartments may also require cleaning.
- Move vehicle / machine with caution. Avoid re-contamination, wash remaining mud etc on tyres / tracks.
- Carry out final inspection to ensure all areas have been cleaned.
- Replace guards (belly plates and other guards on heavy machinery may need to be replaced prior to moving the machinery).
Appendix 5  Weed Treatment Form
Weed Treatment Form
(Please complete and submit to the Site Manager)

Date: .............................................  Sheet No: .............................................

Name / Company: ..........................................................................................

Location: ..........................................................................................................

GPS Location:  Lat: ..............................................  Long: ..........................................

Day Conditions:  (sunny, overcast)..................................................................

Pre-treatment Photos:  Y / N  Photo Nos: ....................................................

Post-treatment Photos:  Y / N  Photo Nos: ....................................................

<table>
<thead>
<tr>
<th>Weed Species Treated</th>
<th>Est. Population Size</th>
<th>Growth Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g. Parthenium</td>
<td>2 plants</td>
<td>Flower, seeds</td>
</tr>
</tbody>
</table>

Treatment Method:  Physical   Chemical   Biological   Cultural

Treatment Description:  (e.g. hand pull, foliar spray)..................................

Herbicide Application:

Trade Name:  (e.g. Roundup Bioactive) ..........................................................

Active Ingredient/s:  (e.g. Glyphosate) .........................................................

Additives / Wetting Agent:  (e.g. water) ....................................................... Dilution: ..............

Additional Notes:  (e.g. erosion, evidence of feral animals, recent fire) ...............

..............................................................................................................................
Appendix 6  ACDC Licence Information
Commercial Operator Licence (Herbicide Distribution) Factsheet

*Department of Primary Industries and Fisheries, Queensland*

A licensed commercial operator is a person who holds a commercial operator’s licence issued under the Queensland *Agricultural Chemical Distribution Control Act 1996* (ACDC Act) to operate ground equipment to carry out ground distribution of herbicides on land that the person or his or her relative does not own or occupy. Only persons who are at least 17 years of age may be issued a commercial operator’s licence.

There are two classes of commercial operator's licences: unrestricted class and restricted class. Whereas an unrestricted class of licence allows an operator to carry out ground distribution of unlimited registered herbicides from any ground equipment, the restricted class of licence restricts the number of types of herbicides and types of ground equipment the operator can use. Applicants are always encouraged to seek an unrestricted class of licence over a restricted class because of the obvious advantages an unrestricted licence provides. The licence is issued for either a three or one year period, nominated by the applicant at time of application.

A licensed commercial operator is permitted to supervise a group of unlicensed operators to use ground equipment to carry out ground distribution if required, provided he or she is present throughout the duration of such ground distribution being carried out and maintains close supervision at all times. When supervising unlicensed operators, a licensed commercial operator should be the person in control who, among other things, takes responsibility for checking the calibration of the spray equipment being used, is satisfied that the correct spray nozzle has been selected, and supervises the mixing and safe handling of the herbicide concentrate. The licensed operator should never leave his or her post. Simply issuing instructions to the unlicensed operators before the ground distribution and then leaving them to carry out the work on their own is not close supervision.
Commercial Operator's Licence
(for ground distribution of herbicides)

Licence Application
Agricultural Chemicals Distribution Control Act 1966, section 17

Privacy Statement: The information collected on this form including personal information, is required to assist the Department of Primary Industries and Fisheries (DPI&F) to assess your application for a commercial operator’s licence under the Agricultural Chemicals Distribution Control Act 1966 (Act). DPI&F will use some of the information collected on this form (ie name, address and details of the licence granted) to maintain an electronic public register required under section 24 of the Act. DPI&F may disclose the information on this form and any information associated with this form to:

- other relevant government agencies (local or interstate) to assist in the management of diseases, pests and residues, investigation of complaints under the Act where necessary, and as part of its compliance and monitoring activities for the licensing and other requirements under the Act and its regulation.
- other areas of DPI&F in order to assist DPI&F in its regulatory functions.
- your nominated ground or aerial distribution contractor.
- officers of the Department of Employment and Training with respect to accreditation issues.

The information collected will only be used for the purposes for which it has been provided. Unless otherwise identified in this statement, your personal information will not be disclosed without your consent unless it is required or authorised by law. Any personal information you provide will be treated in accordance with DPI&F’s Privacy and Security Statement located at http://www.dpi.qld.gov.au/cps/index/dippi/his.xsd/79_ENA_HTML.htm

Background Information

This form is to be completed by a person applying for a commercial operator’s licence of either unrestricted or restricted class who meets the prerequisites below.

Who needs a commercial operator’s licence?

A person operating ground equipment from which ground distribution of herbicides is to be carried out in the course of the business of, at the direction of, or under the authority of a licensed ground distribution contractor or licensed aerial distribution contractor requires a commercial operator’s licence.

Factors that can determine whether a person needs this licence include the type of ground equipment being used and the location in Queensland where ground distribution is being carried out.

There are two classes of commercial operator’s licence.

- The unrestricted class of commercial operator’s licence permits the operator to distribute all types of herbicides from all types of ground equipment. Applicants are encouraged to obtain this class of licence.
- The restricted class of commercial operator’s licence permits the operator to distribute restricted types of herbicides from restricted types of equipment as listed on the licence. It is issued under limited circumstances.

Pre-requisites of commercial operator’s licence

Before making an application, the applicant needs to:

1. be at least 17 years old; and
2. obtain the prescribed qualification, being either:

   (a) accreditation approved by the Agricultural Chemicals Distribution Control Board (Board). Currently the accreditation approved by the Board is the holding of Statements of Attainment issued by a registered training organisation registered under the Training and Employment Act 2000 or similar legislation of another State, certifying competency at Australian Qualifications Framework level 3, with respect to the following national units of competency (or their replacement when these units are revised):

      (i) RTC 3704A - Prepare and apply chemicals
      (ii) RTC 3401A - Control weeds
      (iii) RTC 3705A - Transport, handle and store chemicals; or

   (b) a pass in a qualifying examination conducted by Department Primary Industries & Fisheries.

Term of licence

A licence may be issued for a term of one year or three years. Please indicate your choice on the application. Examples of situations where a one year licence may be preferred could include short term unemployment schemes or short term voluntary conservation programs.

Need further information?

Please contact the DPI&F Business Information Centre: Phone on weekdays between 8am and 6pm - 13 25 23 (Queensland residents) or +61 7 3404 6999 (non-Queenslanders) or by email: callweb@dpi.qld.gov.au:

- for details of the prescribed fee;
- assistance to complete this form;
- guidance as to whether you have the appropriate qualifications or accreditation; or
- if uncertain whether the ground equipment you intend using for ground distribution of herbicides requires you to hold a commercial operator’s licence.

Lodgement Details

The completed form, together with the prescribed fee as indicated in the section headed “Fee Payment Details”, any signed attachments and any accompanying documents must be lodged with:

Biosecurity Queensland,
Department of Primary Industries and Fisheries,
80 Ann Street, Brisbane or
GPO Box 46, Brisbane, QLD 4001

The application fee will be refunded if the application is not granted.

An incomplete application or the failure to submit the correct prescribed fee will delay the processing of the application.
Commercial Operator’s Licence (for ground distribution of herbicides) Licence Application cont...

1. Applicant Details  (The applicant is the person applying for the licence)

Class of commercial operator’s licence you are applying for (tick ONE box):  

<table>
<thead>
<tr>
<th></th>
<th>Restricted</th>
<th>Unrestricted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Title (eg, Mr, Mrs, etc.)

Family name

Given name/s

Residential address

<table>
<thead>
<tr>
<th>Postcode</th>
</tr>
</thead>
</table>

Postal address  (If same as Residential address, please insert “As above”)

| Postcode |

Daytime Contact Details

<table>
<thead>
<tr>
<th>Telephone</th>
<th>Facsimile</th>
<th>Mobile telephone</th>
<th>Email address (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( )</td>
<td>( )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Are you at least 17 years old?  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>STOP - Do not proceed with this application as you fail to meet one of the pre-requisites.</th>
</tr>
</thead>
</table>

2. Details of Licence Qualification Held

Which type of qualification you currently hold? (tick ONE box)  

<table>
<thead>
<tr>
<th>Passed examination</th>
<th>Accreditation approved by the Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>Go to section 3</td>
<td>Go to section 4</td>
</tr>
</tbody>
</table>

3. Examination Details

Do not complete if qualification is approved accreditation, complete section 4.

Place of examination

<table>
<thead>
<tr>
<th>Date of examination</th>
</tr>
</thead>
</table>

Was the examination for a restricted or unrestricted licence?  

<table>
<thead>
<tr>
<th>Unrestricted</th>
<th>Restricted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Go to section 5</td>
<td>Complete details below</td>
</tr>
</tbody>
</table>

Name/s of herbicides for the restricted licence (You may nominate a maximum of 5 herbicides. Active constituents of herbicides are preferred over herbicide brand names, e.g. “glyphosate” is preferred to “Roundup”)

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
</table>

Type/s of ground equipment nominated for restricted licence

4. Approved Accreditation Details

Do not complete if qualification is the licence examination, complete section 3.

Do you hold Statements of Attainment signed by a registered training organisation for the following national units of competency: (place a tick in the boxes if your answer is 'yes')  

<table>
<thead>
<tr>
<th>RTC 3704A – Prepare and apply chemicals</th>
<th>RTC 3705A – Transport, handle and store chemicals</th>
<th>RTC 3401A – Control weeds</th>
</tr>
</thead>
</table>

Note: A certified copy of these Statements of Attainment must accompany this application.

Continued over page...
**Commercial Operator’s Licence (for ground distribution of herbicides) Licence Application cont...**

Name of registered training organisation that has issued these Statements of Attainment

<table>
<thead>
<tr>
<th>Address of this registered training organisation</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Postcode</th>
</tr>
</thead>
</table>

☐ Tick this box if you have attached to this application a certified copy of these Statements of Attainment.

(A certified copy must be attached).

---

**5. Details of Distribution Contractor/s**

You need to provide details here of the ground or aerial distribution contractor/s under whose direction or authority you intend carrying out ground distribution of herbicides. If you are not assigned to a contractor to enable you to carry out ground distribution of herbicides at this stage, please write “no contractor at this stage” in the Business/company/person’s name field.

If you are also the ground or aerial distribution contractor, and your details as the contractor are the same as the applicant details in part 1, insert “Same as Applicant details in part 1” in the Business/company/person’s name field. Please complete details of the licence number if known, then go to the next section.

**Contractor 1**

<table>
<thead>
<tr>
<th>Business/company/person’s name</th>
<th>Ground or Aerial distribution contractor licence number (if known)</th>
</tr>
</thead>
</table>

Physical (street) address

<table>
<thead>
<tr>
<th>Postcode</th>
</tr>
</thead>
</table>

Postal address (If same as Physical address, please insert “as above”)

<table>
<thead>
<tr>
<th>Postcode</th>
</tr>
</thead>
</table>

**Contractor 2**

<table>
<thead>
<tr>
<th>Business/company/person’s name</th>
<th>Ground or Aerial distribution contractor licence number (if known)</th>
</tr>
</thead>
</table>

Physical (street) address

<table>
<thead>
<tr>
<th>Postcode</th>
</tr>
</thead>
</table>

Postal address (If same as Physical address, please insert “as above”)

<table>
<thead>
<tr>
<th>Postcode</th>
</tr>
</thead>
</table>

Attach a separate signed sheet to this application if more space is required.

---

**6. Terms of Licence**

Length of the licence applied for: (tick ONE box)

- One (1) year licence ☐
- Three (3) year licence ☐

---

**7. History of Particular Offences**

Please tick appropriate box for the following questions:

- Have you been convicted of an offence against the *Agricultural Chemicals Distribution Control Act 1966*?
  - Yes ☐
  - No ☐

- Have you been convicted of an offence against the *Health (Drugs and Poisons) Regulation 1996*, section 290 (relating to unsafe disposal of poisons)?
  - Yes ☐
  - No ☐

If you answered “Yes” to either of these questions please provide details of the conviction(s):

- ...
- ...
- ...
- ...
- ...
- ...

*Continued over page...*
8. Fee Payment Details

Which fee applies to your licence? (tick ONE box)

One (1) year licence ☐  Three (3) year licence ☐

Payment options (tick ONE payment option only)

☐ Money Order or Cheque (Please attach to this form. Please mark Cheque “Not Negotiable.”)

☐ Credit Card (Please complete details below)

Type: (tick one box)  Visa ☐  MasterCard ☐  American Express ☐

Name of cardholder

Card number ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ...
Privacy Statement: The information collected on this form including personal information, is required to assist the Department of Primary Industries and Fisheries (DPI&F) to assess your application for examination for a commercial operator’s licence under the Agricultural Chemicals Distribution Control Act 1966 (Act). DPI&F will use the information on this form to maintain an electronic database of all applications for examination. The database will only be accessible by authorised DPI&F personnel. DPI&F may disclose the information on this form and any information associated with this form to:

- other relevant government agencies (local or interstate) to assist in the management of diseases, pests and residues and the investigation of complaints under the Act where necessary, and as part of its compliance and monitoring activities for the licensing and other requirements under the Act and its regulation.
- other areas of DPI&F in order to assist DPI&F in its regulatory functions.

The information collected will only be used for the purposes for which it has been provided. Unless otherwise identified in this statement, your personal information will not be disclosed without your consent unless it is required or authorised by law. Any personal information you provide will be treated in accordance with DPI&F’s Privacy and Security Statement located at: www.dpi.qld.gov.au/cps/ide/xchg/dpis.xsl/79_ENA_HTML.htm.

Background Information

This form is to be completed by a person wishing to sit an examination conducted by the Department of Primary Industries and Fisheries (DPI&F) as a prescribed qualification for a commercial operator’s licence of either unrestricted or restricted class. If you hold approved accreditation (see below) you qualify for the licence without sitting the examination.

The approved accreditation is Statements of Attainment issued by a registered training organisation registered under the Training and Employment Act 2000 or similar legislation of another State, certifying competency at Australian Qualifications Framework level 3, with respect to the following national units of competency (or their replacement when these units are revised):

- RTC 3704A - Prepare and apply chemicals
- RTC 3401A - Control weeds
- RTC 3705A - Transport, handle and store chemicals.

Who needs a commercial operator’s licence?

A person operating ground equipment from which ground distribution of herbicides is to be carried out in the course of the business of, at the direction of, or under the authority of a licensed ground or aerial distribution contractor requires a commercial operator’s licence.

There are two classes of a commercial operator’s licence:

- The **unrestricted class** of commercial operator’s licence permits the operator to distribute all types of herbicides from all types of ground equipment. Applicants are encouraged to obtain this class of licence.
- The **restricted class** of commercial operator’s licence permits the operator to distribute restricted types of herbicides from restricted types of equipment as listed on the licence. It is issued under limited circumstances.

Factors that can determine whether a person needs a licence include the type of ground equipment being used and the location in Queensland where ground distribution is being carried out.

A commercial operator’s licence can only be issued to a person who is at least 17 years old who has the prescribed qualifications.

Information relating to the licence examination

The class of licence determines the form of the examination, as specified below:

- **Unrestricted class** - Applicant must pass an open book written examination based on knowledge gained from studying the approved study text. It is permissible for the candidate to bring to the examination a copy of the approved study text and copies of the relevant legislation and refer to these during the examination. No other reference material is permitted to be brought to the examination.
- **Restricted class** - Applicant must pass a practical skills assessment testing the competency of the applicant to use the nominated equipment and herbicides.

Need further information?

Please contact the DPI&F Business Information Centre: Phone on weekdays between 8am and 6pm - 13 25 23 (Queensland residents) or +61 7 3404 6999 (non-Queenslanders) or by email: callweb@dpi.qld.gov.au;

- for details of the prescribed examination fee;
- assistance to complete this form;
- guidance as to whether you have the appropriate qualifications;
- if uncertain whether the ground equipment you intend using for ground distribution of herbicides or your location require you to hold a commercial operator’s licence.

Lodgement Details

The completed form, together with the prescribed fee, as indicated in the section headed “Fee Payment Details”, any signed attachments and accompanying documents must be lodged with:

- Biosecurity Queensland
  Department of Primary Industries and Fisheries
  80 Ann Street, Brisbane QLD 4000
  GPO Box 46, Brisbane, QLD 4001

An incomplete application or the failure to submit the correct prescribed fee will delay the processing of the application.

Continued over page...
Commercial Operator’s Licence (for ground distribution of herbicides) Examination Application cont...

1. Applicant Details (The applicant is the person wishing to sit the examination)

Title (eg. Mr, Mrs, etc.)

Family name

Given name/s

Residential address

Postcode

Postal address (If same as Residential address, please insert “As above”)

Postcode

Daytime Contact Details

Telephone

Facsimile

Mobile telephone

Email address (optional)

2. Application for Examination

Nominate whether you wish to sit an examination to qualify for a: (tick ONE box)

Unrestricted Licence □ Go to Section 3

Restricted Licence □ Complete details below

Nominate type/s of herbicides you require to be listed on your restricted class licence when granted (you may nominate a maximum of 5 herbicides. Active constituents of herbicides are preferred over herbicide brand names, e.g. “glyphosate” is preferred to “Roundup”)

Nominate type/s of ground equipment you require to be listed on your restricted class licence when granted

3. Questions Relating to Application

Have you previously applied for and sat for an examination for a commercial operator’s licence?

No □ Go to section 4

Yes □ Complete details below

Please list all examination sittings before this application:

<table>
<thead>
<tr>
<th>Examination sitting number</th>
<th>Where examination took place</th>
<th>Examination Date (If exact date not known please approximate)</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Applicant Checklist

You are satisfied that you do not hold the appropriate accreditation. □ Yes □ No

Has the required examination fee been tendered? □ Yes □ No

Have all questions in this application been answered? □ Yes □ No

If applying to sit for an examination for a licence of unrestricted class, has the approved study text and the relevant legislation been obtained? □ Yes □ No

If you ticked “No” at any time, do not submit this application.

Continued over page...
5. Fee Payment Details

Payment options (tick ONE payment option only)

- [ ] Money Order or Cheque (Please attach to this form. Please mark Cheque “Not Negotiable”)
- [ ] Credit Card (Please complete details below)

Type: (tick one box)
- Visa
- MasterCard
- American Express

Name of cardholder

Card number

Card expiry date

Total amount

Cardholder’s phone number

Cardholder’s signature

Is a receipt required? (an official receipt will not be forwarded unless specifically asked)
- Yes
- No

6. Applicant Declaration

I declare that:

(a) the particulars provided in this application and any information associated with this application are true and correct; and
(b) I have read and understood the Privacy Statement on page 1 and I consent to the use of my information on this form as set out in the Privacy Statement.

Signature of applicant

Date

Name of witness (please print)

Signature of witness

Date

Warning: Penalties exist for deliberately making a false or misleading statement.

Office Use Only

Examination approved

Reason for refusal

Examination refused

Examination fee

Examination fee receipt number

Date received

Examination mark

Pass

Fail

Examination date

Place of examination

Name of examiner

Signature of examiner

Date
Appendix 7  Weed Infestation Alert Form
# Weed Infestation Alert Form

(Please complete and submit to the Site Manager)

<table>
<thead>
<tr>
<th>Weed Species</th>
<th>Est. Population Size</th>
<th>Growth Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>e.g. Parthenium</em></td>
<td>2 plants</td>
<td><em>Flower, seeds</em></td>
</tr>
</tbody>
</table>

Date: ........................................ Sheet No: ........................................

Name of Recorder: ..........................................................................................................

Location: ......................................................................................................................

GPS Location: Lat: .................................. Long: ........................................

Photos: Y / N Photo Nos: .........................................................................................
Appendix 8  Desktop Marine Pest Results
National Introduced Marine Pest Information System (NIMPIS) ‘Search by distribution (Queensland)’ Results

The search term ‘Search by distribution (Queensland)’ lists marine pests known to occur in Queensland coastal waters. Guidance on state specific marine pests, initially informed by the NIMPIS database ‘search by distribution’ should be used in conjunction with national, state, territory and local regulations at all times.

Amathia distans (bryozoan)

Synonyms: Amathia brasiliensis, Amathia goodei.

Common names: bryozoan.

Anteaeolidiella indica (Japanese aeolid)


Antennella secundaria (knotted thread hydroid)


Common names: knotted thread hydroid.

Botrylloides leachi (colonial ascidian)

Synonyms: Botrylloides boloniense, Botrylloides clavelina, Botrylloides cyanescens, Botrylloides fulgurale, Botrylloides insigne, Botrylloides leptum, Botrylloides nigrum, Botrylloides parvulus, Botrylloides perspicuum, Botrylloides prostratum, Botrylloides purpureum, Botrylloides pusilla, Botrylloides radiali, Botrylloides ramulos, Botrylloides rotifera, Botrylloides rubrum, Botrylloides sparsa, Botrylloides translucidum, Botrylloides tyreum, Botrylloides vinosa, Botryllus leachii, Botryllus sp, Metacarpa leachi, Sarcobotrylloides espevaerense, Sarcobotrylloides jacksonianum, Sarcobotrylloides pannosum.

Common names: colonial ascidian.

Botryllus schlosseri (star ascidian)

Synonyms: Alcyonium schlosseri, Botryllus gouldii, Botryllus rubens, Botryllus stellatus, Botryllus virescens, Sarcobotrylloides racemosus.

Common names: star ascidian, colonial ascidian, golden star tunicate.

Bugula flabellata (bryozoan)

Synonyms: Not Found.

Common names: bryozoan.
**Bugula neritina** (bryozoan)

Synonyms: Not Found.

Common names: bryozoan.

**Caulerpa taxifolia** (aquarium caulerpa)

Synonyms: *Caulerpa pinnata, Fucus taxifolius*.

Common names: aquarium caulerpa, killer alga, lukay-lukay (philippines).

**Ciona intestinalis** (solitary ascidian)

Synonyms: *Ascidia corrugata, Ascidia diaphanacea, Ascidia intestinalis, Ascidia membranosa, Ascidia ocellata, Ascidia pulchella, Ascidia tenella, Ascidia virens, Ascidia virescens, Ascidia viridiscens, Ciona (Pleurociona) edwardsi, Ciona canina, Ciona diaphanacea, Ciona fascicularis, Ciona gelatinosa, Ciona indica, Ciona ocellata, Ciona pulchella, Ciona robusta, Ciona sociabilis, Ciona tenella, Phallusia intestinalis, Tethyum sociabile*.

Common names: solitary ascidian, sea vase.

**Cordylophora caspia** (hydroid)

Synonyms: *Cordylophora dubia, Cordylophora fluviatilis, Cordylophora lacustris otagoensis, Cordylophora lacustris var. otagoensis, Cordylophora whiteleggei, Tubularia caspia*.

Common names: hydroid.

**Cryptosula pallasiana** (bryozoan)

Synonyms: *Lepralia pallasiana, Smittina pallasiana*.

Common names: bryozoan.

**Halecium delicatulum** (hydroid)

Synonyms: *Halecium delicatula, Halecium flexile, Halecium gracile, Halecium parvulum, Halecium parvulum var. magnum*.

Common names: hydroid.

**Hopkinsia plana** (sea slug)

Synonyms: *Doris eolida, Okenia (Okenia) plana*.

Common names: sea slug, hime-ibara-umiushi (Japan).

**Hydroides elegans** (fouling serpulid)

Synonyms: *Eupomatus elegans, Hydroides incrustans, Hydroides multispinosa, Hydroides norvegica, Hydroides norvegica, Protohydroides elegans*.

Common names: fouling serpulid.
**Megabalanus tintinnabulum** (acorn barnacle)

Synonyms: *Balanus tintinnabulum antillensis*, *Balanus tintinnabulum communis*, *Balanus tintinnabulum tintinnabulum*, *Lepas tintinnabulum*, *Megabalanus antillensis*.

Common names: acorn barnacle.

**Obelia dichotoma** (hydroid)

Synonyms: *Clytia dichotoma*, *Laomedea dichotoma*, *Obelia australis*, *Obelia braziliensis*, *Obelia commissuralis*, *Obelia griffini*, *Obelia hyalina*, *Sertularia dichotoma*.

Common names: hydroid.

**Paracerceis sculpta** (sponge isopod)

Synonyms: *Cilicaea sculpta*, *Sergiella angra*.

Common names: sponge isopod.

**Paradella dianae** (sphaeromatid isopod)

Synonyms: *Dynamenella dianae*, *Dynamenopsis dianae*.

Common names: sphaeromatid isopod.

**Perna viridis** (Asian green mussel)

Synonyms: *Chloromya viridis*, *Mytilus (Chloromya) smaragdinus*, *Mytilus (Chloromya) viridis*, *Mytilus opalus*, *Mytilus smaragdinus*.

Common names: Asian green mussel, green mussel, green lipped mussel, Philippine mussel, sea mussel, Philippine green mussel.

**Plumularia setacea** (hydroid)

Synonyms: *Algaophenia setacea*, *Corallina setacea*, *Pennaria setacea*, *Plumularia californica*, *Plumularia corrugata*, *Plumularia lagenifera*, *Plumularia mileri*, *Plumularia multinoda*, *Plumularia palmeri*, *Plumularia palmeria*, *Plumularia trirpartita*, *Plumularia turgida*, *Sertularella setacea*, *Sertularia pinnata*.

Common names: hydroid.

**Schizoporella unicornis** (lace coral)

Synonyms: Not Found.

Common names: lace coral, single horn bryozoan, orange encrusting bryozoan.

**Sphaeroma walkeri** (marine pill bug)

Synonyms: Not Found.

Common names: marine pill bug, aquatic pill bug, Indian marine pill bug.

**Styela plicata** (solitary ascidian)

Synonyms: *Ascidia plicata*, *Styela gyrosa*, *Styela pinguis*, *Tethyum plicatum*. 
Common names: solitary ascidian.

*Teredo navalis*  (naval shipworm)

Synonyms: Not Found.

Common names: naval shipworm, common shipworm, Atlantic shipworm.

*Ulva fasciata*  (sea lettuce)

Synonyms: *Phycoseris fasciata*.

Common names: sea lettuce, sea strap lettuce.

*Watersipora arcuata*  (lace coral)

Synonyms: *Dakaria subovoidea*, *Watersipora subovoidea*.

Common names: lace coral.
Appendix 9  Incident Reporting Form (Interim)
Incident Reporting Form (Interim)

Please complete and submit to Site Manager

Incident Form Number: ...........

Nature of Incident (circle one):  Pest Animal  Weed  Quarantine

Date: .................................................................................................................................

Time: ...............................................................................................................................

Name/Company: .............................................................................................................

GPS Location: Lat: ......................Long: .................................................................

Species Identified: ...........................................................................................................

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Description of Incident: ..............................................................................................

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Action Required: ...........................................................................................................

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Additional Notes: .........................................................................................................

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Signature: .......................................................................................................................