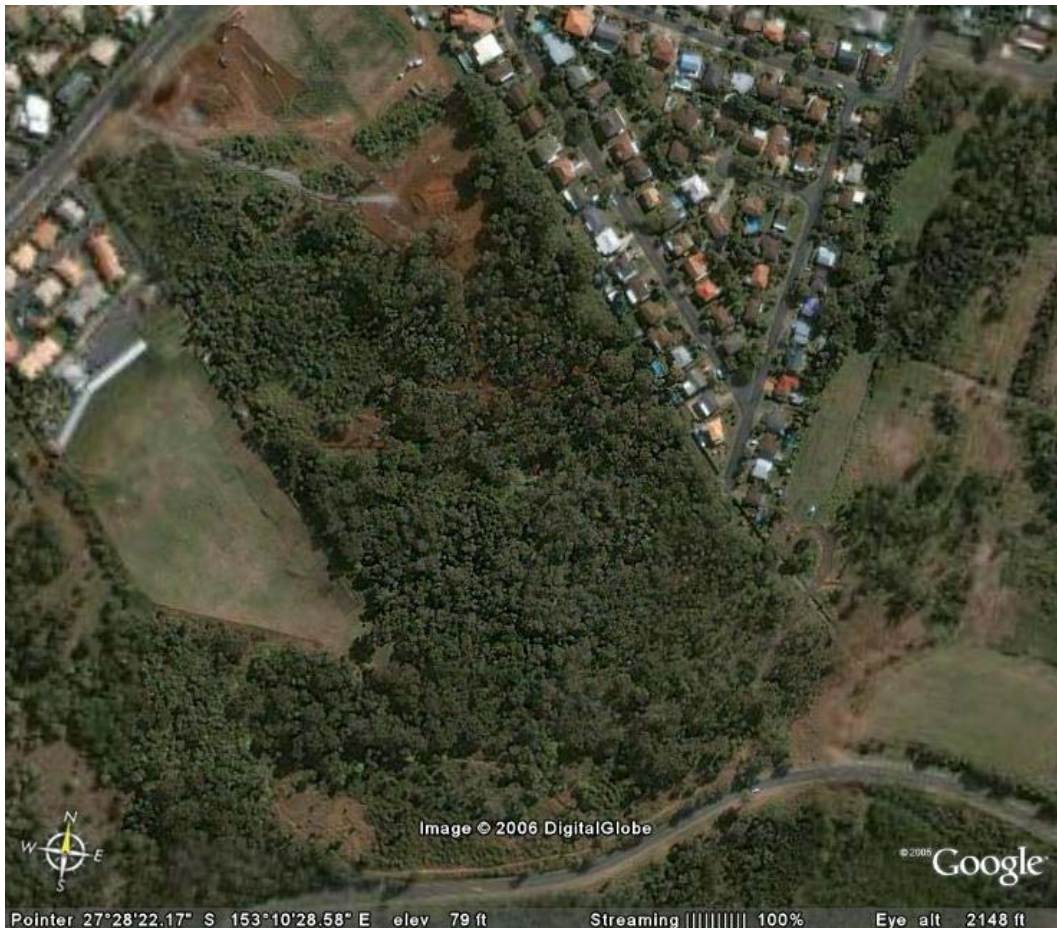


LORD OF THE WEEDS

By Joshua Gillespie



Introduction to Plot Area

The five and a half hectare remnant bushland on the eastern side of Moreton Bay Boys' College, recently gazetted as a **nature refuge** is of vital importance to the local community and environment. This is due to the presence of the rare orchid (*Phaius tancarvilleae*) and its importance regionally for the threatened **Grey Goshawk** (*Accipiter novaehollandiae*) and **koala** (*Phascolarctos cinereus*). This area is of great importance for me and the local community for its value as a resource for environmental education and it's inclusion in a regionally important wildlife corridor.

The school's nature refuge is located on the edge of a **wildlife corridor** and is separated from the main area of remnant bushland by Whites Road on the eastern border. It is located next to a golf driving range on the south side, a **residential** area on the north side and the school on the west side.

This area has been use for many purposes throughout the history of local settlement, including use as a water storage area for a strawberry farm (as suggested by two dams in the refuge) and more recently as a target area for local bushland rejuvenation efforts.

The refuge includes habitat of national and regional importance including remnant paperbark swampland and wet sclerophyll forest. These areas however are home to a multitude of weeds including **Creeping Lantana** (*Lantana montevidensis*) **Easter Cassia** (*Senna pendula*) and **Camphor Laurel** (*Cinnamomum camphora*)

These weeds have gained access to the area due to the presence of the driving range and residential areas nearby allowing weeds to gain access to the refuge due to the eliminated **buffer area** and the increased accessibility of the refuge to pets and people. This increased accessibility has greatly increased the presence of weeds in the area to the point that the majority of significant flora in the refuge consist of introduced weed species.

After the rehabilitation of the habitat in the refuge, the area is planned to be used as an environmental study area where students at **Moreton Bay Boys' College** can learn about local **habitats, flora and fauna**. The plot where the rehabilitation process is taking place is ten metres from the southern border of the refuge and is 3x3 metres in area. It is located in the south east of the refuge and contains melaleuca woodland and a small area of ferns. It has a wide variety of weeds including **Camphor Laurel** (*Cinnamomum camphora*) and **Easter Cassia** (*Senna pendula*).

The area contains a population of native snails and carpet pythons (*Morelia spilota*). However it's importance for wildlife is severely reduced by the abundance of weed species in the area and its presence close to an open area (**edge effect**). But through the rehabilitation of this area we hope to encourage the return of native wildlife and reduce the impact of weeds and edge effect on the plot and the **nature refuge** as a whole.

Problems and Significant Weeds Identified

In the nature refuge there are many significant weeds to be found. These include: **Easter Cassia** (*Senna pendula*) **Chinese Celtis** (*Celtis sinensis*) and **Camphor Laurel** (*Cinnamomum camphora*). They form a significant component of the flora of the nature refuge and the area in which the rehabilitation is taking place.

In the rehabilitation plot there is found a wide variety of weeds including **Dutchman's pipe** (*Aristolochia elegans*), the **Umbrella tree** (*Schefflera actinophylla*), **Guinea Grass** (*Panicum maximum*) and **Corky Passion Vine** (*Passiflora suberosa*).

These weeds have a significant effect on the fauna. The **Dutchman's pipe** (*Aristolochia elegans*) for example attracts the rare butterfly **Richmond's Birdwing Butterfly** (*Orniphoptera richmondii*). The butterfly breeds on its leaves which are poisonous and kills the caterpillars. This poison also is suspected of killing poultry and livestock.

The refuge's **environment** also suffers with these weed species competing with native plants by over shading them and out-competing them for resources. This has destroyed the native undergrowth which is now dominated by the weed species **Ochna** (*Ochna serrulata*) and **Easter Cassia** (*Senna pendula*). The canopy also has a significant population of **Camphor Laurel** (*Cinnamomum camphora*), **Chinese Celtis** (*Celtis sinensis*) and **Umbrella tree** (*Schefflera actinophylla*) competing with the native **Melaleucas** and **Eucalypts**.

These weeds have spread throughout the refuge due to it's proximity to residential areas and human activity. This is the source of many of the weeds present including **Easter Cassia** (*Senna pendula*) and **Fishbone Fern** (*Nephrolepis cordifolia*). Other weeds have been spread through wind dispersal and birds. This proximity to urban areas and the ability for weeds to spread combined with the disturbed nature of the site has seen weed become a dominant feature of the environment. This compromises its benefits to native fauna.



Plot area in the nature refuge

The weed management strategy

The weed management strategy for the plot area focuses on the removal of major weed species present. Then the subsequent re-vegetation of species already native to the refuge or those which are present in the local area. A quick summary of the weed management strategy is provided below.

- Hand removal of small un-established weeds and small invasive vines such as **Corky Passion Vine** (*Passiflora suberosa*) and (*Aristolochia elegans*)
- Removal of invasive grass by hand removal such as **Guinea Grass** (*Panicum maximum*).
- Planting of native grasses such as **Kangaroo Grass** (*Themeda triandra*) and **Blady Grass** (*Imperata cylindrica*).
- Removal of invasive shrubs and established and difficult to remove plants such as **Ochna** (cut and paste and hand removal)
- Planting of native shrubs and trees such as **Swamp Box** (*Lophostemon suaveolens*) and *Acacia fimbriata*.
- Removal of **Fishbone Fern** (*Nephrolepis cordifolia*) by digging them out.
- Planting of **Bracken** (*Pteridium esculentum*) in area where **Fishbone Fern** (*Nephrolepis cordifolia*) was removed.
- Cutting and pasting of established invasive trees such as **Chinese Celtis** (*Celtis sinensis*) and **Camphor Laurel** (*Cinnamomum sinensis*).
- Planting of native **Broad Leaved Paperbarks** (*Melaleuca quinquenervia*) where the large weed trees used to stand.
- Observation and continued maintenance of plot and removal of any subsequent weeds.



Umbrella Tree (*Schefflera actinophylla*)

Revegetation and Habitat Enhancement Plan

The revegetation plan for the plot area focuses on providing suitable replacement species for the various weed species that are present in the plot. The replacement species have been chosen based on their natural presence in the nature refuge or their presence in the local area. Some have been chosen as important species for the re-colonisation of endangered or regionally threatened species.

List of Native species for revegetation:

- **Kangaroo Grass** (*Themeda triandra*)
- **Blady Grass** (*Imperata cylindrica*)
- **Monkey Rope Vine** (*Parsoni straminea*)
- **Richmond Birdwing Vine** (*Aristolochia praevenosa*)
- **Wombat Berry** (*Eustrephua latifolius*)
- **Broad-Leaved Melaleuca** (*Melaleuca quinquenervia*)
- **Swamp Box** (*Lophostemon suaveolens*)
- **Brisbane Wattle** (*Acacia fimbriata*)
- **Cheese Tree** (*Glochidion ferdinandi*)
- **Bracken** (*Pteridium esculentum*)

These plants have been included in the revegetation scheme due to their presence in the refuge or their replacement for introduced weeds. The reasons are listed below:

- **Kangaroo Grass** and **Blady Grass** has been included as fodder for **Bandicoots** and **Wallabies** and as shelter for small animals and invertebrates. Replacement for **Guinea Grass**.
- **Aristolochia praevenosa** has been included as a replacement for **Dutchman's Pipe** and to protect the rare native butterflies that breed on **Dutchman's Pipe** mistaking it for this vine. It is being planted to provide breeding habitat for the **Richmond's Birdwing Butterfly** and the **Big Greasy Butterfly**.
- **Monkey Rope Vine**. Replacement for introduced vines.
- **Wombat Berry**. Replacement for introduced vines and food and breeding resource for invertebrates and birds.
- **Broad-Leaved Melaleuca**. Replacement for **Camphor Laurel** and **Chinese Celtis** and food source for native mammals and birds.
- **Swamp Box** and **Cheese Tree**. Food source for native birds and mammals. Mid layer shrub. Minimiser of the edge effect.
- **Bracken**. Food source for wallabies and replacement **Fishbone Fern**.

Merits of Weed Management Strategy

The rehabilitation strategy for the plot has many merits. Firstly, it composes the planting and revegetation of species native to the refuge and local area. This increases its benefits for indigenous fauna. It also is designed to minimize edge effect with plantings composed of all layers of vegetation from the forest floor to canopy. This strategy will greatly improve the area by providing both food and shelter for native fauna and by building up a natural forest environment.

The changes expected include the establishment of mid layer shrubs and trees and a ground layer of native grasses and ferns as well as the removal of weeds. After this is completed, maintenance will be easy and productive until the plantings are established and can maintain their own environment. After this only small check-ups will be necessary to maintain the improved natural environment. This strategy should last for generations as the plan is designed to integrate all aspects of the bushland and to provide a diverse range of benefits to the local environment. The fact that the plants are native to the area increases the chances of the species remaining in the rehabilitation area for a long time after the rehabilitation work is finished.

Major Weed Information

Mickey Mouse Plant *Ochna serrulata*

Family: Ochnaceae.

Form: Shrub

Origin: Native of southern Africa.

Flowers/Seedhead: Flowers: Solitary on stalks 1–2 cm long; petals about 1 cm long, yellow, soon falling. Flowers spring to summer.

Description: Shrub to 2.5 m high. Leaves oblong to elliptic, 2–6 cm long, shiny, with toothed margins; leaf stalk almost absent to 1.3 cm long. Fruit round, green initially, ripening black, succulent on the red expanded part of the stalk where fruit attaches (receptacle) and surrounded by the bright red petal-like structures (sepals), 8 mm long, that are often mistaken as Ochna's flower. One seed in each fruit.



Distinguishing features: Distinguished by branches with raised corky areas (lenticels). Sepals green at first, becoming enlarged and red in fruit, turning down when fruit is mature.

Dispersal: Spread by seed.

Dutchman's Pipe *Aristolochia elegans*

Introduction

Dutchman's pipe is a medium sized perennial vine native to the Caribbean and South America. Distinguished by climbing habit with leaves with a heart-shaped base, leaf stalk twisted and with a stipule-like small leaf at the base. Flowers showy, made up of large pipe-shaped, petal-like calyx. The fruits an oblong capsule 4–6 cm long and to 2.5 cm wide, ending in a projection about 1 cm long. The seeds are heart-shaped.



National significance.

This weed is a class 3 declared plant.

Toxic effects

Aristolochia elegans is toxic to two species of native butterflies that attempt to breed on it. They are *Ornithoptera priamus* and *Ornithoptera richmondii*. The Cairns Birdwing and Richmond's birdwing respectively. This plant is also suspected of being toxic to livestock.

Environmental impacts

This plant smothers native vegetation and prevents native species from establishing in an area.

How they spread

Dutchman's pipe spreads through wind dispersal of its seeds.

Competition with native plants

This plant competes with native vines and trees eventually smothering and killing them. This plant has been especially damaging for various native *Aristolochia* vines including *Aristolochia praevenosa* and *Aristolochia delectata*.

Other problems

This plant thrives in wet sclerophyll forest, rainforest and disturbed areas. It also is found in areas which are moist and provide a moist environment which it can grow in.

Weed management

Management of Dutchman's pipe varies on the size of the plant. Larger plants can be removed using two methods. Stem scraping which involves removing the bark from a small area of stem and dousing the area with poison or cutting and pasting which involves cutting the vine down and dousing the remaining stem with poison. Smaller less established plants can be removed manually.

Fishbone Fern

Nephrolepis cordifolia

National Significance:

No declaration, but is classified as a W4c weed, meaning it can't "be sold, propagated or knowingly distributed, and that an occupier must prevent its spread to an adjoining property".

Environmental Impacts:

- Can become naturalised in nearby moist situations, and potentially choke out other ground vegetation
- It spreads aggressively. If removed incorrectly, the bulbs remain in the ground and quickly reproduce.

How They Spread:

Under each leaf on the fronds, there is a small seed (see top left picture). Each of these seeds has the potential to fall on the ground and germinate. Each of the roots, when taken out of the ground and planted in another area, have the potential to become another full fern.



Competition with Native Plants:

Fishbone ferns create a blanket of vegetation where they grow. Native plants cannot get through this barrier, and are choked to death.

Other Problems:

This weed survives with minimal water, and can grow in very adverse conditions, making it a difficult plant to remove completely.

Weed Management Strategy:

Some non-chemical methods of removal are to remove them by pulling them out, or using controlled burning. This weed has rhizomes, (underground stems) which are a way it can spread. Chemical options are to use glyphosate or metsulfuron and spot spray the base of the plant. Be careful with the plant remains, as there is a possibility of re-growth.

Camphor Laurel

Cinnamomum camphora

National Significance:

Class 3 Declared plant in Queensland

Toxic effects:

Fruit is toxic to native birds

Environmental impacts:

- invades pastures so it takes over grazing land
- Replaces native blue gums and this may reduce the koala population
- Trees can damage structures



How they spread:

The seeds of the camphor laurel are spread by birds. A large tree can produce over 100 000 seeds every year.

Competition with native plants:

The camphor laurel tree is a large evergreen tree that can grow up to 20 m tall. They provide dense shade to any native plants trying to grow in the understorey of the bush and they grow readily from seeds dropped by birds.

The strong camphor fragrance and oil makes it difficult for other plants to grow under a camphor laurel tree. The mature trees also have a massive root system that competes with other plants for groundwater.

Other problems:

These trees flourish in soil types that once supported rainforest. It competes strongly with Forest red gum and blue gums.

Weed management strategy:

Small trees will be pulled out by hand and removed from the site.

Larger plants will be stem-scraped and painted with glyphosate within 15 seconds.

Some sites contain large, fallen, dead branches of camphor laurel. These will be cut into lengths and left to enhance the habitat for small animals and insects.

Chinese Celtis

Celtis sinensis

Family: Ulmaceae.

Form: Tree

Origin: Native of China, Korea and Japan.

Flowers/Seedhead: Inflorescence of few flowers, upper flowers bisexual, lower flowers male with stamens falling before sepals; sepals 4, purplish on outer surface, about 2.5 mm long and 1 mm wide, wider than enclosed petals; petals 4, cream and as long as sepals; stamens 4. Flowers late winter to early spring.

Description: Deciduous shrub or tree to 15 (rarely to 25) m high. Bark smooth, silvery grey. Leaves with base attaching to leaf stalk asymmetrically; leaves emerging at flowering initially hairy, particularly below, but rapidly becoming almost hairless. Fruit globe-shaped, succulent, 6–8 mm wide, on stalk 0.4–1 cm long.

Distinguishing features: Distinguished by mature leaves 4–10 cm long, 2–4.5 cm wide, ovate, dark green, mostly hairless and shiny above, lower surface with hairs on veins and paler than upper surface, margins toothed in the upper half only, mature fruit orange-brown.

Dispersal: Seeds spread by birds, fruit bats and water.

Notes: Naturalised in damp areas, particularly along banks of waterways, in south-east Queensland and to a lesser extent in north-east New South Wales. An important environmental weed in these areas. Commonly found on clay soils. Seeds rarely survive for more than two years.

Broad Leaved Pepper Tree

Schinus terebinthifolia

National Significance:

NSW has declared the Broad-leaf pepper tree a W2 status weed. A W2 status weed must be fully and continuously destroyed. A W2 weed poses a threat to agriculture, the environment and has the ability to spread to other areas to infect them. The Broad-leaf pepper tree is a native to Brazil.

Toxic effects:

The Broad-leaf pepper tree may be poisonous to animals or humans. It contains toxic resins and is a relative of the Rhus tree and Poison Ivy. Some people may suffer severe itching, injuries such as cuts, rashes, reddening swelling of the face, running sores and welts associated with the sap and flowering trees. Livestock rarely eat the plant though it has been reported to be toxic to some mammals and birds.

The pollen can cause respiratory difficulty.

It is also reported to be toxic when over handled.

Environmental impacts:

The Broad-leaf pepper tree invades and infests coastal wetlands, edges of salt marshes and mangroves, disturbed sites, watercourses and other low-lying areas.

How they spread:

These plants are usually spread by seed dispersal by birds and mammals.

The tree produces bright red berries that are attractive to Fruit Bats and other animals that have a fruit based diet.

The Broad-leaf pepper tree was originally introduced as a ornamental shrub – this was the initial cause of the spread of the weed.

Competition with native plants:

Broad-leaf pepper trees choke out native plants by taking up valuable sun, space and nutrients. The tree tends to grow out and up and can cover a large amount of space in which all sunlight is kept out.

Many berries will fall off and stay under the cover of soil and can remain there for a period of ten years before they can't seed to produce a new tree.

Other problems:

The tree harbours a disease that can kill mangroves.

Weed management strategy:

- As birds are the main method of spread of the tree, removal should be done in winter.
- Hand pull or chip out young plants.
- Cut and swab – cut completely through stems or trunk and apply glyphosate within 15 seconds of cutting the trunk.
- Stem injection – horizontal cuts all around the trunk and apply glyphosate within 15 seconds of cut.
- Cut away about 2 inches below the soil, chip away all the bark and nail a tin plate down over the stump. Sometimes the plant won't start to regrow until 18 months after initial chopping.
- The Broad-leaf pepper tree can be put through a wood chipper to make mulch.



Events

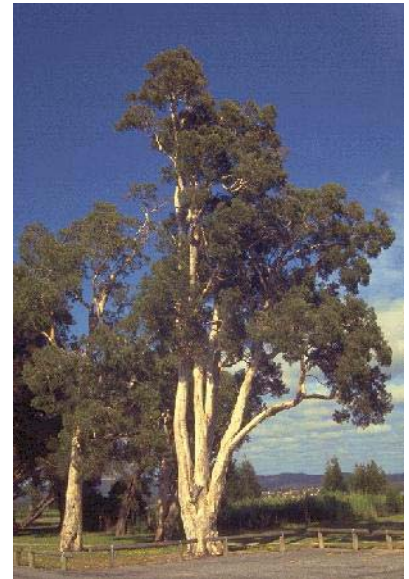
Here is listed the timeline of events from the onset of the year nine science project, Lord of the Weeds.

Timeline of events

- At the onset of the project we set up the plot area into a grid of six 4x3 plots
- The gathering of unidentified weed species
- We had visitors from the "Bayside Creeks catchments' group" who showed us a PowerPoint telling us what they do and about the refuges part in a local **Wildlife corridor** before identifying unidentified weeds in the refuge.
- At this point we researched information about weed species in the refuge and about weed management
- After this was done we commenced drafting the written report
- Then we typed our final written report
- Then on Tuesday 22nd of May we began our work in the plot area removing weeds and starting revegetation. This will be ongoing.

Glossary

- **Wildlife corridor:** An area of bushland providing a connection between two habitat remnants
- **Buffer Area:** The buffer zone is the area disturbed on the edge of bushland before the habitat becomes
- **Edge effect:** The effect where weeds infiltrate the edges of bushland reducing its worth as habitat
- **Habitat:** Area where animal live
- **Nature Refuge:** Privately owned land which is protected by law from development
- **Residential Zone:** Housing area.
- **Flora:** Plants
- **Fauna:** Animals



Broad-leaved Paperbark
(*Melaleuca quinquenervia*)

Conclusion

The work in the nature refuge is just beginning, but with continued work and supervision the environment of the nature refuge will improve and native species will return. Our hard labour will be rewarded with a place where the local environment is preserved and where subsequent generations can continue to appreciate and learn about our environment and realise the important role we play in its preservation and protection.

Then perhaps we can learn how vitally important it is to preserve our environment, not only for it but for ourselves.

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Year 9
Moreton Bay Boy's College