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A 35-year Odyssey

Dry Rainforest regeneration project at the Grafton Agricultural Research Station, Trenayr.

1. Background.

The Clarence Environment Centre's involvement with the Trenayr dry rainforest remnant dates back to 1990 and the receipt of a grant through the Australian Government's "Save the Bush" scheme. Titled the "Rainforest Remnants Rescue", the project identified and described some 40 rainforest remnants across the lower Clarence River catchment.

The work of assessing those remnants was undertaken by botanists Phill Gilmore and Carole Helman, who finally completed the Stage 2 report on the project in June 1993.

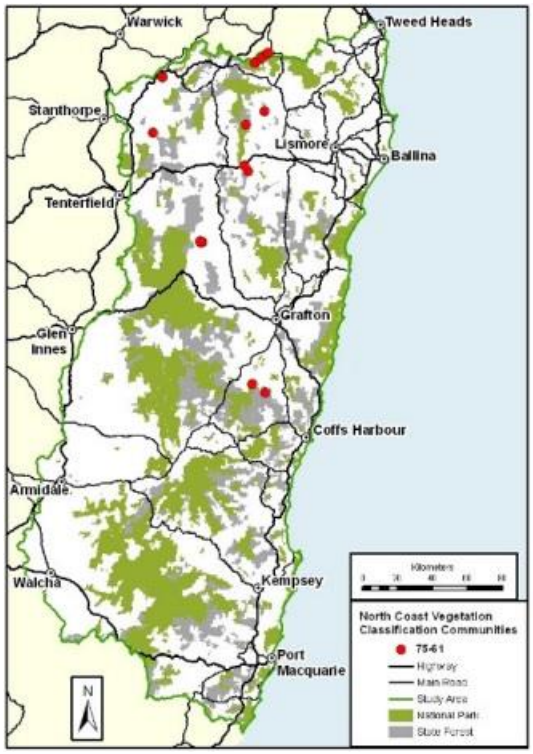
The Trenayr rainforest remnant at the Grafton Agricultural Research Station, is described in their report as: ***"Alliance: Drypetes - Araucaria; Sub alliance 22: Flindersia spp. – Araucaria"***. This is a little odd as there are no *Araucaria* (Hoop Pines) present. However, I believe that the authors took the view that Hoop Pines had been there in the past, but most likely logged out in the early 1900s. The following image published by EnvITE in 2003, and likely taken in the 1990s, shows a sparse canopy which supports that theory.

This image was taken by EnviTE prior to undertaking bush regeneration work in the late 1990s

Gilmore and Helman's report explains that, prior to 2000, the remnant had been routinely grazed and slashed, adding that *"The most common tree species at this site are Acacia aulacocarpa and Jagera pseudorphus*, both known to be rainforest pioneer species following major disturbance. (Note: subsequent studies determined the Acacia is *A. disparrima*, not the similar *A. aulacocarpa).* *"Other tree and shrub species include Flindersia australis, Alphitonia excelsa, Grevillea robusta, Trema Aspera, Alchornia ilicifolia, and Lantana camara".*

2. Definition of the subject site.

Community description. The rainforest remnant is growing upon the Agricultural Research Station site, Lot 268, DP 1139113, Parish of Great Marlow, County of Clarence, and is listed in the Clarence Valley Local Environmental Plan 2011 - Schedule 5 – Environmental heritage; under Part 1, Heritage item.



Examination of the Trenayr rainforest and attempting to align it with any of the communities described in the Office of Environment and Heritage's "Vegetation classification for the Northern Rivers catchment area of New South Wales has not been easy. However, if we accept the theory that Hoop Pine *(Araucaria cunninghamii)* should be present, we can confidently align that rainforest to ***Dry Rainforest Community 347: Hoop Pine - Crow's Ash - Silky Oak dry vine rainforest on well-drained fertile soils, NSW North Coast Bioregion and Southeastern Queensland Bioregion.***

The official description of **Community 347 is**: *"A moderate to tall, closed canopy forest community with emergent Hoop Pine (Araucaria cunninghamii), Crow's Ash (Flindersia australis), Cudgerie (Flindersia schottiana), Yellow-wood (Flindersia xanthoxyla), Lacebark (Brachychiton discolor) and Silky Oak (Grevillea robusta). Mostly on basalt-derived soils overlaying siltstones. The incidence of deciduousness is relatively high in this community, with several of the emergents and main canopy trees losing leaves during flowering events. These include Lacebark (Brachychiton discolor), Flame Tree (Brachychiton acerifolius), Silky Oak (Grevillea robusta), White Cedar (Melia azedarach), Deciduous Fig (Ficus superba var. henneana) and Crow's Ash (Flindersia australis). Vines are numerous and include Zig-Zag Vine (Uvaria leichhardtii), Cockspur (Maclura cochinchinensis) and Simple Water Vine (Cissus antarctica). The ground-layer is mostly sparse and includes Small Sickle Fern (Pellaea falcata) and several species of Shield Fern (Lastreopsis decomposita and Lastreopsis microsora).*

Current condition. Close to 150 flora species are listed as occurring in Community 347, 127 of which are known to occur at this latitude, and include the following:

Indicative species:

(**Note: Species highlighted in blue have been recorded at the Trenayr remnant, approximately 33%. Future regeneration efforts might give preference to planting the unhighlighted species, where available, to increase species diversity**).

Adiantum formosum. Alchornea ilicifolia, Alectryon subcinereus, Alectryon tomentosus, Alphitonia excelsa, Alstonia constricta, Alyxia ruscifolia, Aphananthe philippinensis, Araucaria cunninghamii, Argyrodendron actinophyllum, Argyrodendron trifoliolatum, Arthropteris tenella, Arytera divaricata, Asplenium attenuatum, Asplenium australasicum, Austrosteenisia blackii var. blackii, Backhousia sciadophora, Baloghia inophylla, Brachychiton acerifolius, Brachychiton discolor, Breynia oblongifolia, Bridelia exaltata, Capparis velutina, Cayratia clematidea, Celastrus subspicata, Cissus antarctica, Claoxylon australe, Cleistanthus cunninghamii, Cordyline petiolaris, Croton insularis, Croton stigmatosus, Croton verreauxii, Cryptocarya bidwillii, Cryptocarya triplinervis, Cupaniopsis parvifolia, Dendrobium gracilicaule, Dendrobium speciosum, Dendrobium teretifolium, Dendrocnide excelsa, Dendrocnide photinophylla, Denhamia bilocularis, Dendrophthoe vitellina, Derris involuta, Dinosperma erythrococcum, Dioscorea transversa, Diospyros australis, Diospyros pentamera, Diplocyclos palmatus, Diploglottis australis, Doodia aspera, Drypetes deplanchei, Dysoxylum fraserianum, Dysoxylum rufum, Ehretia acuminata var. acuminata, Elaeodendron australe, Elattostachys nervosa, Elattostachys xylocarpa, Embelia Australiana, Erythrina vespertilio, Euroschinus falcatus, var. falcatus, Ficus macrophylla subsp. macrophylla, Ficus obliqua, Ficus rubiginosa, Ficus watkinsiana, Flindersia australis, Flindersia schottiana, Geijera salicifolia, Geitonoplesium cymosum, Gossia bidwillii, Gossia hillii, Grevillea robusta, Guioa semiglauca, Harpullia hillii, Harpullia pendula, Hibiscus heterophyllus subsp. heterophyllus, Hodgkinsonia ovatiflora, Ixora beckleri, Jasminum volubile, Jagera pseudorhus var. pseudorhus, Lastreopsis decomposita, Legnephora moorei, Lophostemon confertus, Maclura cochinchinensis Mallotus philippensis, Melia azedarach, Melicope micrococca, Muellerina celastroides, Myrsine variabilis, Neolitsea australiensis, Nyssanthes diffusa, Olea paniculata, Pandorea jasminoides, Pandorea pandorana, Pararchidendron pruinosum var. pruinosum, Parsonsia straminea, Pellaea nana, Pellaea paradoxa, Pittosporum multiflorum, Pouteria australis, Platycerium superbum, Polyscias elegans, Pseuderanthemum variabile, Psychotria daphnoides, Psychotria loniceroides, Psydrax odorata, Pyrrosia confluens var. confluens, Pyrrosia rupestris, Rhodosphaera rhodanthema, Rhysotoechia bifoliolata subsp. bifoliolate, Ripogonum album, Sarcomelicope simplicifolia subsp. simplicifolia, Scolopia braunii, Senna barclayana, Smilax australis, Streblus brunonianus, Strychnos arborea, Tetrastigma nitens, Teucrium junceum, Toona ciliata, Trophis scandens, Uvaria leichhardtii, Vitex lignum-vitae, Wikstroemia indica.

Discussion. We must acknowledge that there has been significant disturbance and modification over the years, as witnessed by the large number of *Acacia disparima,* a species that is not on the above list, but is now a dominant component of the forest canopy. This is undoubtedly the result of historic clearing and disturbance which has invited this well-known local pioneer species to take over. Also, there is evidence that many larger trees have been killed by the earlier Cat's Claw Creeper invasion, all contributing to the relatively low species count at this time.

There is also evidence of historical sheet erosion and compacted soils resulting from past grazing activities, leaving some areas with little or no topsoil, so full recovery will take time.

3. Rainforest rescue efforts

Significantly, Gilmore and Helman's report included the warning that: *"There are vine species, of which the most common is the aggressive introduced weed, Macfadyena unguis-cati, the Cat's Claw Creeper".* (See image below).

Despite this negative assessment, the report still identifies the remnant as having high conservation significance, explaining that: *"Although disturbed and mainly regrowth, this site is probably the best of the remaining remnants of the Dry Rainforest that would have occurred on the lower slopes near the floodplain in the Lower Clarence".*

Claw Cat's Creeper

In summary, the report noted that: *"Being on government land and with current management sympathetic to maintaining the rainforest, it would be a good site for a weeding and regeneration project".*

That recommendation led to various volunteer weeding projects in the late 1990s and early 2000s. Mostly sporadic and infrequent, that work involved cutting large vines to free up the canopy and reduce seed set.

In 1998 Hank & Sue Bower prepared a comprehensive management plan commissioned by NSW Agriculture for Environmental Training & Employment Inc. outlining regeneration aims. Further work (Austin 1998) located a population of the shrub, Brush Sauropus *(Phyllanthus microcladus* Muell. Arg.), which is listed as endangered under the Threatened Species Conservation Act 1995. That discovery represented a significant southern extension of the species' known distribution and added to the site's significance in terms of conservation value (**note**: subsequent discoveries of that species at Shannon Creek, Nymboida and Buccarumbi has further extended its range).

The first serious weed eradication and bush regeneration project was carried out by EnviTE over a 3-year period between 2003 and 2006, funded by the NSW Environmental Trust, which resulted in their all but eliminating the Cat's Claw Creeper problem.

Subsequently, the agricultural research work at the station was drastically cut, and a not so "sympathetic" Forests NSW (now NSW Forestry Corporation) took over management of the site. It seems the site's Plan of Management was shelved, as the much-needed follow-up weed work was not undertaken. Consequently, within a mere decade, EnviTE's excellent work was completely undone, with the forest reverting to a weed-infested mess.

And Cat's Claw Creeper was not the only problem: Some areas had reverted to impenetrable thickets of another invasive weed, Lantana (see below), while in other areas *Ochna,* and Corky Passionfruit Vine were also having a detrimental impact.

A new biosecurity hub had been established at the research station to develop and test biocontrol agents for a range of exotic weeds, so rather than undertake a serious weed eradication effort, they used the rainforest as a trial site, introducing a range of insect predators and pathogens over the next five years or so.

Areas of the remnant with no canopy were quickly overtaken by Lantana

In about 2016, with the endangered *Phyllanthus* now being smothered by Cat's Claw once again, the Environment Department's Saving our Species team became involved, providing funding to clear weeds from the immediate surrounds of the 4 known sub-populations at the site. This saw the Clarence environment Centre involved once again with its professional bush regeneration team contracted to carry out the work.

However, it was clear that annual clearing of weeds only from the immediate vicinity of the *Phylanthus* would be a waste of money and time, as the Cat's Claw grew back as quickly as it was removed. The CEC approached EnviTE, thinking they might have a vested interest in revisiting the site, and it just so happened that they were looking for a project, and jumped at the opportunity. That funding was shared with the Centre, allowing further inroads to be made in eradicating weeds across the site.

The Centre had a very generous budget to undertake the SOS contract, including funding for annual monitoring and reporting, so had already begun to expand the work area well beyond the agreed boundaries using any surplus funds, including the reporting allowance, which was then undertaken pro-bono as an in-kind contribution.

The SOS team was kept informed, and enthusiastically supported the expansion plan and the need to protect the entire remnant and provided some additional funding.

Very soon, the Lantana (top left) was poisoned (top right), and then replanted with rainforest trees (see below).

Credit must be given to the SOS, and in particular, the project manager at the time, Lia Hooper, whose support over the next 4 years saw our budget more than doubled, and slowly but steadily, the the team was able to work its way across the remnant.

The team slowly worked its way across the remnant, clearing weeds as it went, the bare earth on the right of the picture, showing where the Cat's Claw has been removed

Then, at the end of 2021/22, when primary removal of Cat's Claw was almost 75% complete, along with ongoing annual follow-up in areas that had already been weeded, the SOS hierarchy decided to pull the funding for *Phyllanthus microcladus* management. Fortunately, the SOS team was able to find some unspent funds from its Lowland Rainforest budget which finally allowed the CEC team to complete the primary treatment of Cat's Claw across the entire 11-hectare site.

Brush Sauropus *(Phyllanthus microcladus)*

Freed from the smothering weed, the endangered *Phyllanthus* are now thriving with evidence of healthy recruitment, while the once struggling 1m tall shrubs have doubled or tripled in height, with one specimen recently measured at close to 4m tall.

As of October 2024, the CEC still has funding to complete the current round of follow-up, but nothing after the end of the year.

Before - Plot 1 in 2019

After - Plot 1 in 2024

Before and after images clearly show the growth of the *Phyllanthus* that has taken place since the Cat's Claw was removed. The person standing in the centre of the right-hand image, is barely visible amongst the *Phyllanthus* shrubs that have more than tripled in height over that 5 year period.

4. Current situation

The completion of primary treatment of Cat's Claw Creeper, Lantana, and lesser problem species such as Dutchman's Pipe Vine, Corky Passion Vine, White Passionfruit, and Micky Mouse Plant (Ochna), does not mean the weed problem no longer exists in the Trenayr rainforest, it is simply temporarily under control

Other invasive weeds that occur at the site include Coral Berry *(Rivina humilis)* and, owing to the site's proximity to the agricultural research plots, a number of exotic grasses and legumes are also present, including Broad-leaved Paspalum *(Paspalum wettsteinii)* and Guinea Grass *(Panicum maximum)*, none of which have received any attention to date as they are not seen as an immediate threat to the rainforest's recovery.

The most serious concern is the Cat's Claw Creeper, a persistent weed that requires years of follow-up treatment, and with several hectares of the site only having received a primary treatment, the threat remains.

The underground tubers (below left) are notoriously hard to spot and kill and even now, the vine continues to shoot even in areas that have received multiple treatments (below right).

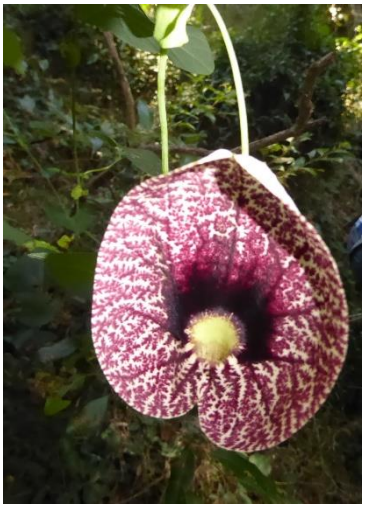
Each Cat's Claw plant can have dozens of underground tubers and even one can start another infestation starting with just a single, hard to see, shoot.

Coral Berry

Corky Passionflower

White Passionfruit

Brazillian nightshade



Dutchman's Pipe

However, to finish on a positive note, we should look at what has been achieved. The following images from the late 1990s and today speak volumes. Note the water trough.

This was the Trenayr rainforest remnant 25 years ago.

This is the remnant today. Can you spot the water trough?

Good things can be achieved if we persist.

Trenayr's rainforest today, a far cry from the stressed forest remnant 30 years ago

To all those that have been involved over the years, take a bow, we salute you.

Compiled by John Edwards
For the Clarence Environment Centre