Notes on the flora of Steve Sharpe's 'home' island in the Pumpkin Island group, Lake Argyle.

ANS 2002

Background
On 1 February 2001, with Steve Sharpe and Chris Done, I visited the one of the Pumpkin Islands (at 16° 16' 12"S 128° 43' 47"E) in Lake Argyle. Steve intends developing it as the centre of a tourist facility. I understood that "remote" chalet-type accommodation would be developed on adjacent islands.

Flood effects
The 2000 flood had inundated about half the island. Most, if not all, the inundated vegetation was dead. When flood waters receded, stinking passion vine (**Passiflora foetida*) had grown rampantly to cover much of that area. Other common colonisers included *Phyllanthus maderaspatensis* and *Cleome viscosa*. Spiny mud-grass (*Pseudoraphis spinescens*) was present as an emergent aquatic near the shoreline.

Natural vegetation above the flood line
The island had had a sparse tree layer of snappy gums (*Eucalyptus brevifolia*) but most trees were dead. It may also have had a denser tall-shrub layer. Thus, several larger woody shrubs (*Calytrix exstipulata, Flueggea virosa, Dichrostachys spicata, Carissa lanceolata, Ehretia saligna* and a *Corchorus* sp.) were represented by only one or two plants. The vegetation is now dominated by the perennial hummock grass, *Triodia bitextura,* and perennial tussock grasses *Eriachne obtusa* and *Sorghum plumosum.*

Fire
Much of the island above the flood line had been burnt in the past few months. Different regeneration stages indicated that there had been at least two burn episodes, a more extensive earlier one (*E. obtusa* was already flowering) and smaller more recent ones. The earlier fire had been hot enough to kill snappy gum stems (which were themselves resprouts). Most of the larger woody shrubs were also post-fire resprouts.

Recent introductions
Two small areas of lawn had been planted. Most grass was still sterile so I don't know what species were present. However a number species associated with the lawns were flowering and were probably (accidental) imports with the lawn. They are listed in Appendix 1. (Although *Paspalum scrobiculatum* is a native grass, it naturally occurs in damp areas. It would not have been naturally present on the island but was thriving in the watered lawn environment). Besides lawn, exotic figs and ixoras had been planted and a pumpkin (identified by Steve as a 'Japanese' pumpkin - he remembers when the seed was introduced) grew beside the boat landing site.

Flora composition
I recorded 48 species of which 15 were grasses or sedges. The origins are shown in Table 1. I have listed thirteen species as 'Australian or local exotics'. Ten are known to be exotic to Australia, two sedges are probably exotic to Australia and one (*Paspalum scrobiculatum*, see above) is locally exotic and introduced to the island.

The latter three were all associated with the lawn. It is notable that the introduction of eleven out of thirteen exotic species are associated with recent developments. These comprise almost a quarter (23%) of the total flora (and note, it is an underestimate because I was unable to identify all species associated with the lawn; some were sterile). Undoubtedly many of the lawn species would not survive on the top of the island without water, but there is a reasonable probability that some, if not all, could become naturalised on the water's edge and spread to other islands. The two exotic species that were not associated with recent activity (stinking passion vine and phyla, **Phyla nodiflora*) are ubiquitous in suitable habitat in the region.

Table 1.

Origins	Number
Original flora	30 (63%)
Post-dam natural native colonists	5 (10%)
Australian or local exotics	13 (27%)
TOTAL FLORA	**48**

I have identified five species as 'post-dam natural native colonists' because they are locally occurring native species that grow on damp surfaces or in water. They were growing close to the water's edge or in it and would have had no suitable habitat here prior to the dam filling. I have listed the remaining thirty species as components of the original flora. Some are 'weedy' (eg *Cleome viscosa*) and may have colonised since the dam was built but it is plausible that they could all have grown in the pre-dam habitat.

Other developments

Steve had cleared the summit and started erecting posts and stone walls around the cleared area. He had also installed a landing and zigzag path from the landing to the summit development.

Conclusions

The vegetation is typical of the small, steep, rocky islands in Lake Argyle. Before the lake filled, these islands were ridge tops and most of their floras are characteristic of that habitat. In pre-dam days, the composition of the flora on each would have been dynamic - there would have been many episodes of temporary loss and recolonisation through the vagaries of nature. Since their isolation by lake waters, losses are likely to have continued for one reason or another but opportunity for recolonisation of species that can not disperse seed across water is probably, at best, rare. Consequently, species diversity is likely to decline with time and the eventual species composition may be, in part, a function of area. Chance (what was there when it formed) and disturbances (eg flood, fire regimes and human activity) will also play a part.

With or without development, the prognosis for trees and taller woody shrubs is poor unless they are pro-actively managed (including reintroductions as necessary). The few remaining individuals are mostly unhealthy. The cause of their decline is unclear, but it seems inevitable that they will progressively disappear. I have seen apparently similar patterns on some of the other very small islands where the long-term prognosis for the same suite of species is probably similar, albeit at a slower rate

elsewhere because of factors that will affect the remaining populations of native vegetation on this island, including:

- Clearing will have reduced the 'effective' size of the island for native flora and that will probably accelerate species loss. (Record post-dam water levels will have exacerbated this factor.)
- Intentional introduction of exotic trees, shrubs and lawns.
- Frequent and/or hot fire is likely to disfavour *Triodia* and probably other shrub species

This is a small island and its development will adversely affect its native flora. However, all the plants I recorded are widespread and abundant and so proceeding with its alienation will have little significant effect on conservation of biodiversity in a regional context. Nevertheless, to proceed would set precedents that may be inappropriate from other perspectives. I leave those issues to managers but there are some conservation issues that I would like to raise.

1. There needs to be control of what exotics are intentionally introduced. Those with bird, wind or water dispersed seed and those that can aggressively colonise damp areas should not be tolerated because of the risk of escape.

2. Planting of exotic species on other islands (including lawns, fruits, ornamentals and shade trees etc near accommodation or in any other situation) should be prohibited.

3. There needs to be vigilance (= monitoring) for accidental introductions and a strategy for eradication of any that do occur.

4. The use of fire needs careful consideration and should only be used in accordance with a fire management plan that sets out clear objectives and strategies.

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Appendix 1 **Flora recorded on Pumpkin (Steve's home) Island. 1 Feb 2001**

	FAMILY	SPECIES	2000 floodline		Lawn or planted
			Above	Below	
Monocots	Cyperaceae	^Cyperus macrostachyos Lam.		1	
	Cyperaceae	#Sedge (ANS 1368)			1
	Cyperaceae	#Sedge (ANS 1369)			1
	Poaceae	*Chloris barbata Sw.	1		
	Poaceae	Aristida hygrometrica R. Br.	1		
	Poaceae	Enneapogon polyphyllus (Domin)N.T.Burb.	1		
	Poaceae	Eriachne obtusa R. Br	1		
	Poaceae	Grass (ANS 1366)	1		
	Poaceae	Grass (ANS 1367)	1		
	Poaceae	Panicum decompositum R. Br.	1		
	Poaceae	#Paspalum scrobiculatum L.			1
	Poaceae	^Pseudoraphis spinescens(R.Br.) Vick.		1	
	Poaceae	Sorghum plumosum (R. Br.)P. Beauv.	1		
	Poaceae	Triodia bitextura Lazarides	1		
	Poaceae	Urochloa holosericea (R.Br.)R.D.Webster		1	
Dicots	Amaranthaceae	Ptilotus exaltatus Nees	1		
	Apocynaceae	Carissa lanceolata R.Br.	1		
	Asclepiadaceae	Cynanchum sp	1		
	Boraginaceae	^Coldenia procumbens L.		1	
	Boraginaceae	Ehretia saligna R.Br.	1		
	Boraginaceae	Heliotropium sp	1		
	Caesalpiniaceae	Senna oligoclada (F.Muell.)Randell	1		
	Capparaceae	Cleome viscosa L.	1	1	
	Convolvulaceae	Bonamia pannosa (R.Br.)Hallier	1		
	Convolvulaceae	Evolvulus alsinodes (L.) L.	1		
	Convolvulaceae	Ipomoea eriocarpa R.Br	1	1	
	Curcurbitaceae	*"Japanese Pumpkin"			1
	Curcurbitaceae	Cucumis melo L.		1	
	Euphorbiaceae	*Euphorbia hirta L.			1
	Euphorbiaceae	*Euphorbia spp (garden erect)			1
	Euphorbiaceae	Flueggea virosa (Roxb. Ex Willd.) Voigt	1		
	Euphorbiaceae	Phyllanthus maderaspatensis L.	1	1	1
	Malvaceae	*Sida acuta Burm.f.			1
	Mimosaceae	Dichrostachys spicata (F.Muell.)Domin	1		
	Molluginaceae	^Glinus oppisitifolius (L.) A. DC.		1	
	Moraceae	*Ficus af. benjamina			1
	Myrtaceae	Calytrix exstipulata DC.	1		
	Myrtaceae	Eucalyptus brevifolia F.Muell.	1		
	Papilionaceae	Tephrosia supina Domin	1		
	Passifloraceae	*Passiflora foetida L.	1	1	
	Portulacaaceae	Portulaca oleracea L.	1		
	Portulacaaceae	*Portulaca spp (purple weed)			1
	Rubiaceae	*Ixora spp (cultivated)			1
	Solanaceae	^Solanum lucani F. Muell.	1	1	
	Sterculiaceae	Corchorus sidoides F.Muell.	1		
	Sterculiaceae	Corchorus spp	1		
	Verbenaceae	*Phyla nodiflora (L.) E. Greene	1	1	
	Zygophyllaceae	Tribulopis pentandra R.Br. in Sturt	1		
		TOTALS	**32**	**12**	**11**

^ = post-dam natural colonist

* = exotic

= probably exotic or locally exot