FLORA OF CONSERVATION SIGNIFICANCE

VICTORIA RIVER HIGHWAY UPGRADE TO IMPROVE FLOODING IMMUNITY

PUBLIC ENVIRONMENTAL REPORT

Prepared by
Donna Lewis (Land & Vegetation), Ian Cowie and Raelee Kerrigan (NT Herbarium)
Department of Natural Resources Environment and the Arts
for Department of Planning and Infrastructure

5TH APRIL 2006

Northern Territory Government
Department of Natural Resources, Environment and the Arts

CONTENTS

List of Figures

List of Tables

SUMMARY

This document identifies plant species of IUCN conservation significance in the localities proposed to be developed for the Victoria River Highway Upgrade. The objectives were to identify and describe the presence, distribution, frequency and associated habitats of these species. Existing flora records and vegetation mapping, collected by Department of Natural Resources Environment and the Arts, were used to complete this assessment.

Thirteen species were recognised IUCN significant in the broader area of the Upgrade. These species either inhabit areas not directly associated with the Upgrade or are widely distributed throughout the Top End, therefore pose no threat. The IUCN category, Vulnerable is the highest threatened status of the 13 species of which two species qualify; *Gleichenia sp.* Victoria River and *Adiantum capillus-veneris*. Habitats of these two species are not directly associated with the proposed Upgrade.

It must be recognised, any further developments, such as gravel extraction to service the Upgrade would require the collection and analysis of additional floristic and structural data to substantiate existing data used in this report.

RECOMMENDATIONS

Further floristic surveys to be undertaken in areas proposed for gravel extraction as existing floristic and structural data used in this report is not exhaustive enough to make comment on potential impacts on flora of conservation significance.

The clearing of native vegetation is compliant with the NT Land Clearing Guidelines (DIPE, 2002). The Guidelines provide technical advice for planning and undertaking land clearing in the NT. Advice is provided for use by land owners, managers and developers on how to clear in a manner that will avoid/minimise adverse environmental impact.

1. INTRODUCTION

Natural Systems (Land & Vegetation) and the Northern Territory (NT) Herbarium of the Department of Natural Resources Environment and the Arts (NRETA) were requested to identify plant species of conservation significance in the Victoria River District for the Department of Planning and Infrastructure (DPI). The assessment is a requirement for the Victoria River Highway Upgrade Public Environmental Report (PER - Section 5.4 Ecology).

This document provides information on plant species of conservation significance based on the International Union for the Conservation of Nature (IUCN) Red List Categories. Data were obtained from the NT Herbarium Holtze specimen database based on several vegetation surveys throughout the Victoria River region. This report makes comment on the Upgrade itself, not proposed gravel extraction sites. It must be recognised, the data used in this report is not extensive.

2. OBJECTIVES

The objectives of the assessment were to use existing floristic data to:

- Identify the presence of plant species with IUCN conservation significance within the broader region of the proposed developed sites for the Upgrade ;
- Determine the distribution and frequency of plant species that have IUCN conservation significance status;
- Describe associated habitats of these species including vegetation communities, landform and in some instances soils, and
- Provide comment on the implications of the proposed development on these plants species and associated habitats.

3. METHODOLOGY

3.1 Flora Records

The NT Herbarium Holtze specimen database was used to search species of IUCN conservation significance within the greater proposed area for development (MGA Zone 52 GDA94):
Top – 8286506.002780
Bottom – 8263817.936571
Left – 699567.749414
Right – 742496.481105

The database search was compliant with the Species Survival Commission of the IUCN Red List Categories (Table 1), a classification system used in assessing the conservation status of species world-wide (IUCN, 2001). This system is a requirement of the *Territory Parks and Wildlife Conservation Act* 2003 (TPWC). All species listed in the NT flora checklist are therefore assigned an IUCN code.

Table 1. IUCN Red List Categories describing the status of NT flora.

Threatened Status	Non Threatened Status
ex: extinct	**nt:** near threatened
ew: extinct in the wild	**lc:** least concern
cr: critically endangered	**dd:** data deficient
en: endangered	**ne:** not evaluated
v: vulnerable	

Plant species that were attributed to the categories Not Evaluated (ne) and Least Concern (lc), were excluded from the database search as they have either not yet been evaluated against the criteria, or are widespread and abundant. Only those species in the categories of Critically Endangered, Endangered, Vulnerable or Near Threatened were considered to be of IUCN conservation significance and therefore selected from the database (refer to Appendices 1 & 2).

Holtze specimen data is derived from numerous botanical surveys in the region including the Survey of *Melaleuca triumphalis* and *Stenostegia congesta* as part of the Victoria River Gorge Ranger Survey Camp, 2001 (Parks & Wildlife, 2001) in Gregory National Park. This survey focused on the biology, distribution and abundance of these species and to reassess their current IUCN status. The two species were considered to be the main threatened plants in the area at that time. Other species of IUCN conservation significance were also identified during the course of the survey.

A total of 72 sites were assessed during the survey for rare and threatened species and vegetation plots recorded. At each site, a comprehensive list of vascular plants was compiled, structural information, landform and surface soils documented. Approximately 183.5km of potential habitat for *Melaleuca triumphalis* and *Stenostegia congesta* was investigated (Fig. 1).

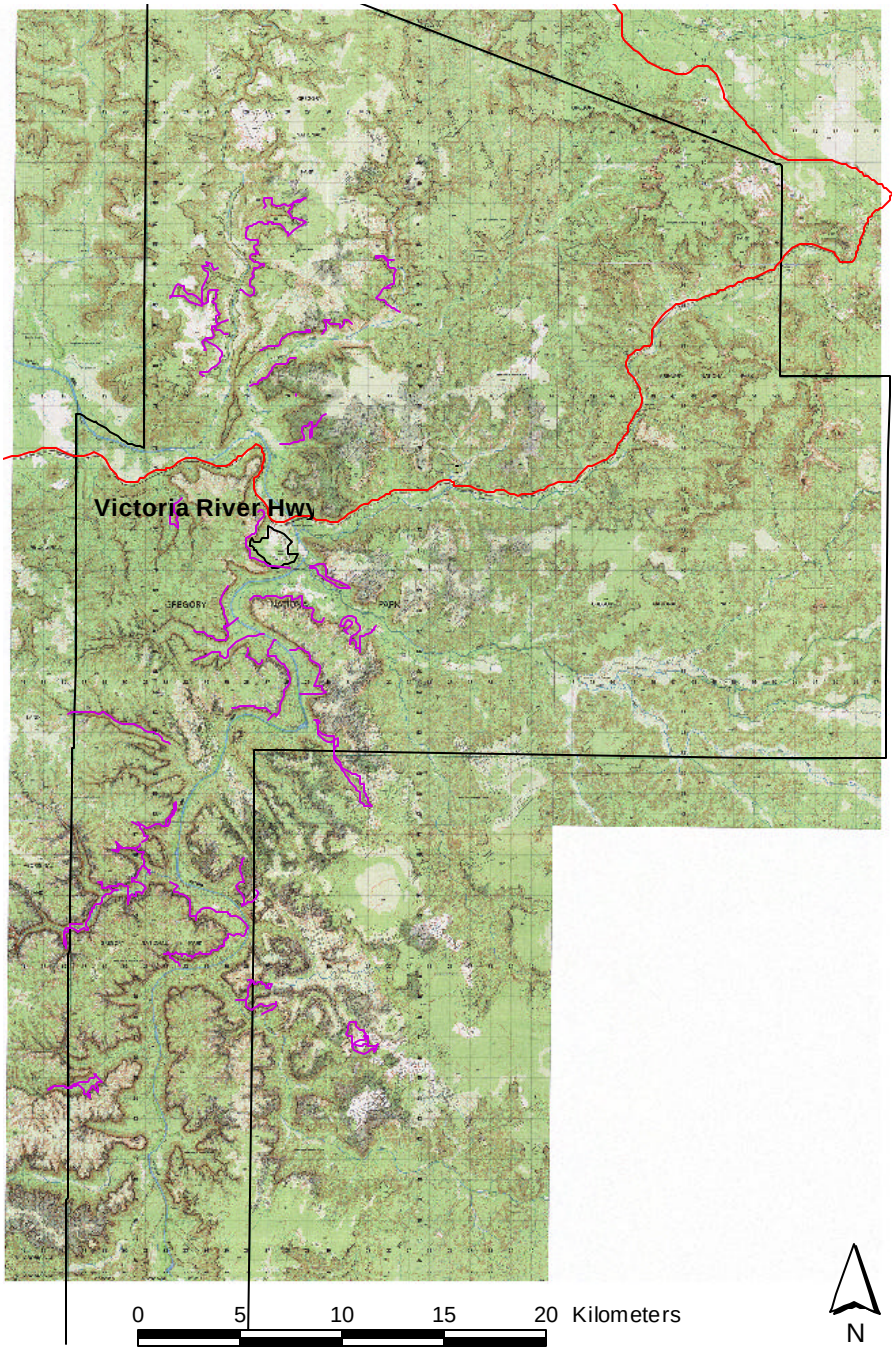


Figure 1. Area traversed during the Survey of *Melaleuca triumphalis* and *Stenostegia congesta*, 2001 illustrated in pink.

3.2 Vegetation Communities

Data from a number of vegetation surveys were consolidated to determine the dominant vegetation communities, landform and where available, associated soils in the greater area of the proposed Upgrade.

The Vegetation Survey of the NT (Wilson *et. al.,* 1990) was used to describe the dominant vegetation communities along relevant areas of the Highway. Although it is mapped at a very broad scale (1:1 000 000), the survey provides an overall ecological perspective of the Victoria River region. In conjunction, vegetation plot data from the Survey of *Melaleuca triumphalis* and *Stenostegia congesta* was used to supplement the mapping of Wilson *et al.* (1990).

4. RESULTS

4.1 Flora Records

Table 2 lists species of IUCN conservation significance including the following information:

- Taxon name - Family, Genus, Species, where applicable sub-species and determinant;
- IUCN categories listed under the TPWC Act 2003;
- Proposed IUCN categories as a result of a re-evaluation 2005 (NT Herbarium *in prep.)*;
- NT endemic species, and
- Habitat description, distribution status and in some instances habit.

From the area searched on the NT Herbarium Holtze specimen database, the proposed IUCN categories identified a total of 13 species of IUCN conservation significance. Of these, two are Vulnerable, six Near Threatened and five Data Deficient (Table 1). The two species of highest threatened status include *Gleichenia sp.* Victoria River and *Adiantum capillus-veneris* both Vulnerable and occurring in habitats at the base of sandstone cliffs on permanent springs, a habitat not affected directly by the proposed Upgrade.

Five species are endemic to the NT, three of which are Near Threatened including *Melaleuca triumphalis*, *Stenostegia congesta* and *Isotropis sp.* Joe Creek. The Near Threatened category however, has no legislative status; it highlights those taxa that currently don't meet any threatened criteria. Ongoing monitoring of these taxa is required as changes in the near future may lead to its qualification. Furthermore, these species are located in habitats not directly affected by the proposed Upgrade including permanent drip lines, seepages or drainage lines at the top of scree slopes and bases of sandstone cliffs (I. Cowie pers. com.).

The remaining Data Deficient species indicate more information is required due to a lack of appropriate data on abundance and distribution. Future research may suggest a threatened classification is appropriate.

The majority of these 13 species inhabit sandstone escarpments, plateaux and gorges (cliffs, scarps, hillcrests, hill slopes, foot slopes, drainage lines, seepage areas). These habitats are not located in the near vicinity of the proposed Upgrade; therefore no direct threat is foreseeable. Those species within and in the vicinity of the proposed Upgrade occur on alluvial plains and river valley's on clay loams and cracking clay soils. Species that are of IUCN conservation significance in these particular habitats are widespread and common in the NT; once again no threat is anticipated

4.2 Vegetation Communities

The vegetation communities that occur in the broader area of the proposed Upgrade are common throughout the Top End and consequently will not be threatened by the Upgrade. Dominant vegetation communities described by Wilson *et al.* (1990) 1: 1 000 000 comprise:

- *Eucalyptus tectifica* (Northern Box), *Corymbia terminalis* (Bloodwood) woodland with *Sehima nervosum* (White Grass), *Chrysopogon fallax* (Golden Beard Grass) grassland understorey;
- *Corymbia dichromophloia* (Variable-barked Bloodwood), *Eucalyptus miniata* (Darwin Woolly Butt) low open woodland with *Triodia pungens* (Curly Spinifex) open hummock grassland understorey;
- *Terminalia arostrata* (Nutwood) low open woodland with *Chrysopogon fallax (*Golden Beard Grass), *Dichanthium* (Bluegrass) grassland understorey.

Structural classification described per Specht (1981).

The vegetation plots assessed for the Survey of *Melaleuca triumphalis* and *Stenostegia congesta*, 2001 were located in habitats outside the proposed Upgrade. To substantiate that of Wilson *et al.* (1990), the few plots described in habitats within or in the near vicinity of the proposed Upgrade include:

- *Eucalyptus microtheca* and *Corymbia terminalis* mid high open woodland over *Sehima nervosum* tall grassland. River valley, crest, clay Loam;

- *Eucalyptus microtheca* over *Panicum decompositum* and *Chrysopogon fallax* grassland. Valley floor, alluvial flat, clay loam, and

- *Eucalyptus microtheca* and *E. camaldulensis* tall open woodland. Alluvial flat, levee bank, cracking clay.

Structural classification described per Walker and Hopkins (1990).

Table 2. List of species with conservation significance compliant with IUCN Red List C ategories.

Taxon Name	TPWC Act 2003	Proposed IUCN Category 2005	NT Endemic	Habitat & Comments
ADIANTACEAE *Adiantum capillus-veneris* L.	v	v	no	Springs at base of sandstone cliffs; of restricted distribution in the NT.
AMARANTHACEAE *Gomphrena leptoclada subsp. saxosa* Benth. J.Palmer	ne	dd	no	Shrubland and woodland on sandstone hills; recorded locality for Victoria River is not accurate although species is widespread in Victoria River District; needs further survey work to determine status.
FABAC EAE *Crotalaria novae-hollandiae subsp. novae-hollandiae* DC.	lc	dd	no	Woodland, clayey soils; much material was not determined to subspecies level at the time of re-evaluation although is now known to be widespread and common in the NT.
FABACEAE *Isotropis sp.* Joe Creek (J.L.Egan 4915)	none	nt	yes	Stabilised scree slopes below cliffs; of restricted distribution in NT.
FABACEAE *Rhynchosia filiformis* Maesen	none	dd	yes	Edge of escarpment, scree slopes below cliffs; of restricted distribution inthe NT.

FABACEAE *Rhynchosia rhomboidea* F.Muell. ex Benth.	none	nt	no	Stabilised scree slopes below cliffs; populations dispersed but uncommon in the NT.
GLEICHENIACEAE *Gleichenia sp.* Victoria River (I.D.Cowie 9193)	none	v	?	Springs at base of sandstone cliffs; of restricted distribution in NT.
MIMOSACEAE *Acacia chisholmii* F.M.Bailey	nt	nt	no	Woodland or open woodland on rocky or sandy soils; locality very general, accurate geocode not available, not relocated despite extensive survey in area in 2001.
MYRTACEAE *Melaleuca triumphalis* Craven	nt	nt	yes	Springs at base of sandstone cliffs; of restricted distribution in the NT. Small shrub, approximately 2.5m tall with grey sub-papery bark.
MYRTACEAE *Stenostegia congesta* A.R.Bean	nt	nt	yes	Springs at base of sandstone cliffs; of restricted distribution in the NT. Weeping shrub up to 4 metres in height. The bark is fibrous and red brown in colour. Flowers are white and cup shaped.
POLYGALACEAE *Polygala sp.* (ciliate alae) (C.R.Michell 615)	none	dd	yes	Stabilised scree slopes below cliffs; relatively widespread in drier parts of the monsoonal zone of the NT; needs further work to determine taxonomic and ecological status.

PTERIDACEAE *Pteris vittata* L.	dd	dd	no	Springs at base ofsandstone cliffs; of restricted distribution in the NT.
RUBIACEAE *Dentella minutissima* C.T.White & W.D.Francis	nt	nt	no	Clay soils near watercourses or waterholes; recorded locality for Victoria River is not accurate although the species is widespread in drier parts of the monsoonal zone of the NT.

Source: NT Herbarium Holtze Specimen Database

5. CONCLUSION

The species of IUCN conservation significance identified in this document were either Vulnerable, Near Threatened or of Data Deficient status. Vulnerable status indicates taxa is threatened and therefore has legislative status. In comparison, Near Threatened and Data Deficient taxa don't meet any threatened criteria, ongoing monitoring is a requirement to detect changes in abundance and distribution for taxa to qualify threatened status in the future.

Although 13 species were recognised as significant, the majority of associated habitats are confined to locations not proposed for development; therefore no substantial impact is expected. Species found in habitats in the vicinity of, or within the areas proposed for development, occur in representative habitats widely distributed throughout the Top End, again no significant threat is anticipated In addition, the area proposed for development is relatively small and located in areas already affected by human disturbance (i.e. Victoria River Highway).

The two species with the highest threatened status in the broader region include *Gleichenia sp.* Victoria River and *Adiantum capillus-veneris* both of Vulnerable IUCN status. The two are restricted to habitats on permanent springs at bases of sandstone cliffs (I. Cowie pers. comm.). Given no development occurs in these habitats, no direct threat is envisaged as a consequence of the proposed Upgrade.

Finally, a substantial number of sites have been selected for gravel extraction to service the Upgrade; these particular sites are located in a variety of habitats including those where Vulnerable, Near Threatened and Data Deficient species are likely to occur. Existing data used in this report is not extensive enough to comment on potential impacts on flora of conservation significance as a result of gravel extraction, therefore additional floristic surveys would be required.

6. REFERENCES

Department of Infrastructure Planning and Environment. (2002) *Land Clearing Guidelines*. Technical Report 27/2002. Department of Infrastructure Planning and Environment, Natural Resource Management Division, PO Box 30 Palmerston, Northern Territory.

IUCN (2001). *IUCN Red List Categories: Version 3.1.* Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.

Parks and Wildlife (2001). *Victoria River Gorge Ranger Survey Camp* – Survey of *Melaleuca triumphalis* Craven (Myrtaceae) and *Stenostegia congesta* A.R.Bean (Myrtaceae). Department of Infrastructure Planning and Environment, Palmerston NT.

Specht, R.L. (1981) Foliage projective cover and standing biomass. In: *Vegetation classification in Australia.* Eds A.N. Gillison, D.J. Anderson. CSIRO and Australian National University Press, Canberra.

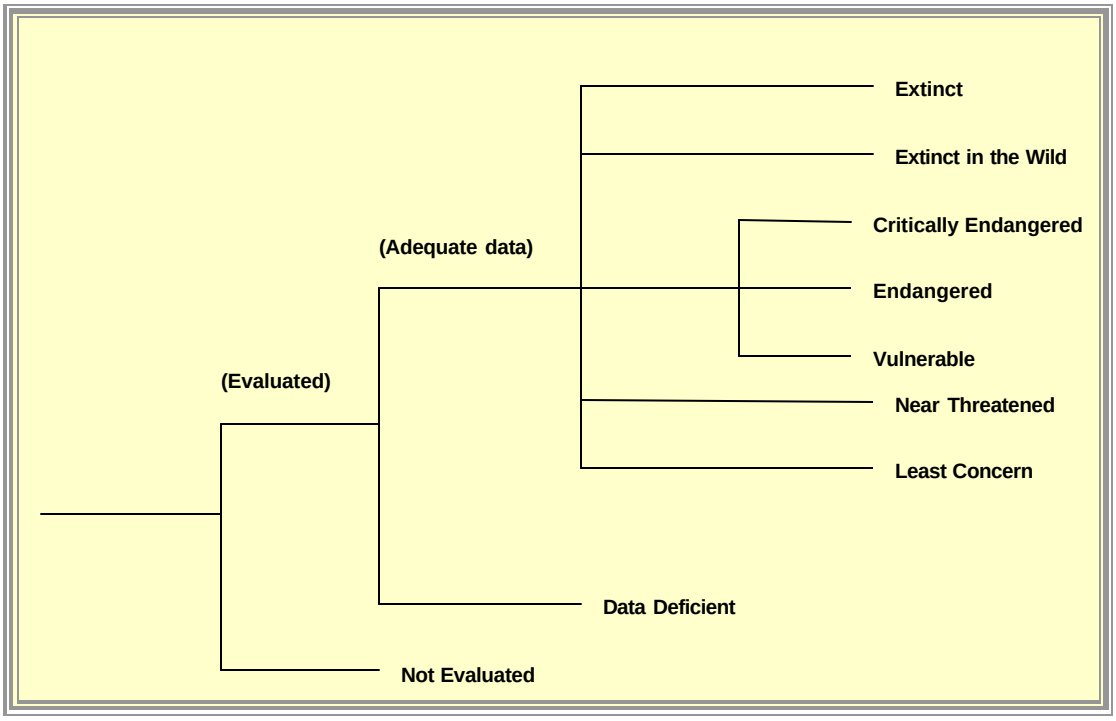
Walker, J. & Hopkins, M.S. (1990) "Vegetation". In: McDonald, R.C., Isbell, R.F., Speight, J.G., Walker, J. & Hopkins, M.S. *Australian Soil and Land Survey Field Handbook*. Second Edition (Yellow Book). Inkata Press, Melbourne, pp. 58-86.

Wilson, B.A., Brocklehurst, P.S., Clark, M.J. & Dickinson K.J.M. (1990) *Vegetation Survey of the Northern Territory, Australia*. Conservation Commission of the Northern Territory, PO Box 496, Palmerston Northern Territory 0831. Technical Report No. 49.

7. APPENDICES

APPENDIX 1

Structure of the IUCN Red List Categories



Source: IUCN, 2001

APPENDIX 2

IUCN Red List Categories Codes & Descriptions

IUCN Category	Description
Extinct (EX)	A taxon is Extinct when there is no reasonable doubt that the last individual has died.
Extinct in the Wild (EW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range.
Critically Endangered (CR)	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered. **A-** reduction in population size. **B-** geographic range either extent of occurrence OR area of occupancy OR both. **C-** population size estimated to number fewer than 250 mature individuals. **D-** population size estimated to number fewer than 50 mature individuals. **E-** quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or 3 generations to a maximum of 100 years.
Endangered (EN)	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered. **A-** reduction in population size. **B-** geographic range either extent of occurrence OR area of occupancy OR both. **C-** population size estimated to number fewer than 2500 mature individuals. **D-** population size estimated to number fewer than 250 mature individuals. **E-** quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or 5 generations to a maximum of 100 years.
Vulnerable (VU)	A taxon is vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable. **A-** reduction in population size. **B-** geographic range either extent of occurrence OR area of occupancy OR both. **C-** population size estimated to number fewer than 10,000 mature individuals. **D-** population very small or restricted to fewer than 1000 mature individuals or capable of becoming Critically Endangered or even Extinct in a very short time period. **E-** quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

Near Threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Least Concern (LC)	A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant data are included in this category.
Data Deficient (DD)	A taxon is Data Deficient when there is a lack of appropriate data on abundance and distribution in assessing risk of extinction. Taxa listed in this category indicate more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.
Not Evaluated (NE)	A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

Source: IUCN, 2001