

Threatened Species of the Northern Territory

Erythroxylum sp. Cholmondely Creek

Conservation status

Australia: Not listed

Northern Territory: Endangered



Photo: J. Westaway

Description

Erythroxylum sp. Cholmondely Creek is a small subshrub to 30 cm high usually with several sparingly branched reddish stems arising from just below ground level. The small leaves are obovate in shape and several small heterostylous flowers can appear in the uppermost leaf axils.

Flowering: February-April

Fruiting: March-June



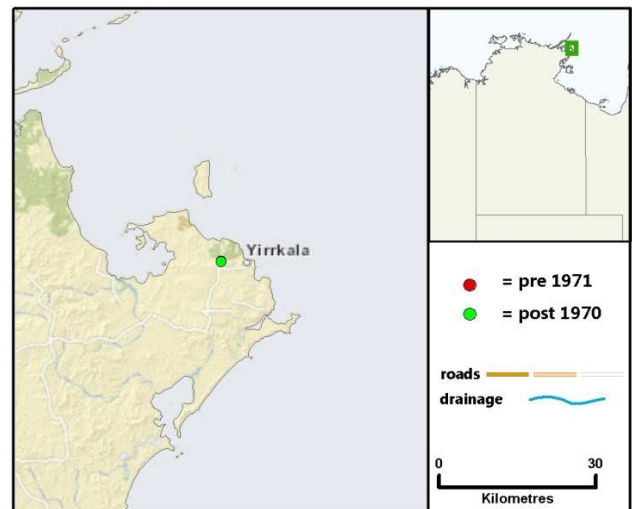
Leaves of *Erythroxylum* sp. Cholmondely (Photo J. Westaway)

Distribution

Erythroxylum sp. Cholmondely Creek is known in the Northern Territory (NT) from only a single small population on the Rio Tinto mine lease on the Gove peninsula in East Arnhem Land. However, *Erythroxylum* sp. Cholmondely Creek is locally common in suitable habitat on

the western side of Cape York Peninsula, Queensland.

Conservation reserves where reported:
None.



Known location of *Erythroxylum* sp. Cholmondely Creek

Ecology

The growth habit of the NT population suggests the species is clonal with vegetative reproduction by root suckering. Plants appear to be evergreen but above ground parts are frequently lost to fires. Plants re-shoot from perennial rootstock at or slightly below ground level.

A detailed molecular study of *Erythroxylum* sp. Cholmondely Creek plants from Gove has been undertaken (van der Merwe et al 2010) confirming the clonal nature of the

population. Flowers are heterostylous and although sexual outcrossing is the dominant form of reproduction within Cape York populations, Gove plants do not appear to produce fruit. Van der Merwe et al (2010) show that the Gove population is exclusively clonal and has undergone a severe loss of genetic diversity after a founder effect.

In the NT, *Erythroxylum* sp. Cholmondely Creek grows on a lowland bauxite plateau in red bauxitic sandy loam with surface pisolitic gravel. The vegetation is Darwin Stringybark *Eucalyptus tetradonta* open woodland with a sparse open mid-stratum of scattered Sand Palm *Livistona humilis* and *Acacia leptocarpa* above a moderately dense tussock grass stratum dominated by the native perennial sorghum *Sorghum plumosum*.

Conservation assessment

Erythroxylum sp. Cholmondely Creek is known in the NT from a single location. Following species-specific targeted survey in 2007 (Westaway 2007) there is now a reduced level of uncertainty regarding the species' NT distribution. Its extent of occurrence and area of occupancy in the NT are both around one hectare.

Despite species-specific targeted searches in appropriate habitat in the Gove area the species remains known from just a single site. This fact together with the considerable level of botanical survey and collecting that has occurred in the vicinity of Gove (748 individuals sample points in 30 by 30 minute cell, half of which is marine), indicate that *Erythroxylum* sp. Cholmondely Creek is among the rarer or most sparsely distributed of the regional woodland flora.

Erythroxylum sp. Cholmondely Creek is also of taxonomic, phylogenetic, biogeographic and evolutionary interest. Van der Merwe et al (2010) describe how the isolated Gove

population compensated for a lack of sexual recombination and gene flow by somatic mutation thus managing to persist through historical environmental change via vegetative means.

Erythroxylum sp. Cholmondely Creek is classified as **Endangered** (under criterion D) based on:

- population estimated to number less than 250 mature individuals.

A decline in the quality of the species' habitat (and thence in the number of individuals) is a possibility due to potential deleterious effects of altered site hydrology and drainage patterns or continued exposure of the small 'island' habitat remnant within the mined landscape (see Threatening processes below).

The protective measures implemented by the mine owners such as cessation of mining activities in the vicinity of the site, creation of a 500 m exclusion buffer and the commencement of a program to establish additional sub-populations in suitable habitat, have now reduced likelihood of a projected decline.

Threatening processes

The site of the only known NT population of *Erythroxylum* sp. Cholmondely Creek has been explored for bauxite and was planned for clearing and mining. Strip mining for bauxite involves removal of the topsoil and as such would have caused loss or destruction of the population. Mine owners recognised the significance of this population and established a 500 m radius buffer around the plants to protect them from mining activities.

The population occurs adjacent an extensive area that has been cleared in preparation for mining. This clearing exposes the woodland containing the *Erythroxylum* sp. Cholmondely Creek population to considerable windthrow

and potential storm and or cyclone damage. As the population size and extent of occurrence are both very small this species is at risk in the NT due to stochastic events such as cyclone.

As the species is a resprouter it exhibits some capacity to recover from disturbance such as fire. However as the surrounding landscape becomes progressively mined, the *Erythroxylum* habitat patch may effectively become an 'elevated' island in a sea of mining as removal of the bauxite layer lowers the surface of the ground by some three metres in height. Such an 'island' would experience altered hydrology and drainage and this may have a negative impact on the ground flora including *Erythroxylum* sp. Cholmondely Creek. The response of the species to alterations in site hydrology and drainage patterns is unknown but could lead to a decline in health or vigour of the population.

The species is not considered at risk or threatened on Cape York.

Conservation objectives and management

Adequate buffering from mining and associated activities in the adjacent forest is necessary for the persistence of this species in the NT. Fire should be prevented from burning the entire population at any one occasion. Incursion of introduced plants from adjacent cleared areas should be controlled. Monitoring of the size, health and dynamics of the population should continue.

Detailed spatial genetic mapping has been undertaken at the Gove site, identifying all the genetic individuals present within the population (van der Merwe et al 2010). Propagation of genets, via cuttings, has been undertaken by Greening Australia Darwin and a management plan has been drafted for

Erythroxylum pusillum Clarkson, *ined.* as it is also known.

The program to establish additional sub-populations in suitable analogous habitat both on and off the mine lease is commendable and should be pursued to completion. Rio Tinto planted out 76 gamets (representing three clones) into a single selected (on lease) site in March 2010. To date a 30 per cent translocation survival success is recorded with plants due to be monitored in December 2010. Additional clones are planned for collection and propagation with the long term aim of establishing a number of viable self-sustaining populations. If it can be demonstrated that new subpopulations are self-sustaining and undergoing an increase in size and numbers then they will have provided a level of conservation security to the original precarious population and the conservation status of this taxon can be re-evaluated.

Complied by

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[updated December 2012]

References

- IUCN (2001). IUCN Red List Categories: Version 3.1. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.
- Van der Merwe, M., Spain, C.S. and Rossetto, M. (2010). Enhancing the survival and expansion potential of a founder population through clonality. *New Phytologist* **188**, 868-878.
- Westaway, J. (2007). *Erythroxylum* sp. Cholmondely Creek, Survey for Alcan Gove, August 2007. Unpublished report to Matrix+ Consultancy. Department of Natural Resources, Environment and the Arts, NT.