LAND UNITS OF TIPPERARY STATION

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Conservation Commission of the Northern Territory
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1. INTRODUCTION

This report documents the land resources of Tipperary Station. Land resources consist essentially of landform, soils and vegetation. By using these, land evaluation can proceed and inferences made on the capability of land for various uses.

Field information has been collected from Tipperary Station from 1980-1985 and has been part of an ongoing programme to map the land resources of the Daly Basin. The mapping of Tipperary Station completes the north-western area of the Daly Basin.

1.1 Survey Area

Tipperary Station covers an area of 1788 km\(^2\) situated approximately 130 km south of Darwin (Figure 1). The Daly River is the southern boundary.

1.2 Previous Mapping

Part of Tipperary Station has been mapped into land systems at a scale of 1:250 000 by CSIRO (1961). The relevant land systems are the undulating terrain of Jindara and Tagaman; plains of Blain and Wriggley; the drainage floors of the Green Ant land system. The plateaux of the Mullaman land system occur only in a small area in the north of Farm 1 (i.e. Mt Pleasant).

Subsequent to this broad scale reconnaissance mapping by CSIRO, portions of the Station have been mapped into land capability classes, soils and land units. This early work exists only as sketch maps and unpublished informal reports and has been superceded by land unit mapping. The previous
Land unit maps of Farm 1 (Mt Pleasant Block) and the Stud Bull Paddock have been incorporated directly into this mapping.


FIGURE 1: Location of survey area
2. GEOLOGY

The geology of Tipperary Station is included in the work of Malone (1962). Three broad physiographic units have been recognized; the mesas, Daly River Basin and the tablelands. Within each of these is a number of rock units which have been most recently described by Needham and Stuart-Smith (1984).

A summary of the rock units and their distribution are provided in Table 1 and Figure 2 respectively.

**Mesas**, confined to the north east corner of the station are very clearly defined. They are capped by part of a lateritic profile, usually a silicified pallid zone which has preserved them at a relatively uniform relief above the general level of erosion. The associated rock unit, formerly known as the Mullamen beds, consists of Mesozoic sediments.

The **Daly River Basin** is an extensive area of undulating plains with occasional rocky hills rising to about 20m above the level of the plain. The undulating plains are comprised of rock units formerly known as the Jinduckin Formation and Tindall Limestone. These are now included as Undivided Cambrian and Ordovician sediments and are often overlain by Quaternary and Cainozoic sediments. Undulating limestone plains predominate over the eastern half of the station.

Underlying sediments outcrop on the western part of the station to form an area of more elevated rocky hills. The major rock units occurring are the Waterbag Creek Formation, Antrim Plateau Volcanics and Hinde Dolomite. Witch Wai Conglomerate has a minor occurrence.
The tablelands flank the western edge of the Daly River Basin. They are partly dissected and deeply cleft along joints. The rock units constituting this area are the former Noltenius Formation (now incorporated with the Burrell Creek Formation), Stray Creek Sandstone and Depot Creek Sandstone. The obvious examples of tablelands are Rock Candy Range and the range extending north from Mt. Nancar.

**TABLE 1: Summary of rock units occurring on Tipperary Station**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qa</td>
<td>Silt, sand, clay, mud; coastal and river alluvium</td>
</tr>
<tr>
<td>Cz</td>
<td>Sand, gravel and laterite; colluvial, talus and transported terrestrial sediments</td>
</tr>
<tr>
<td>K</td>
<td>Fine to coarse sandstone, siltstone and conglomerate; marine and terrestrial sediments</td>
</tr>
<tr>
<td>CO</td>
<td>Undivided Limestone, sandstone, siltstone, dolomite Cambrian and calcilutite, marl. Ordovician Sediments</td>
</tr>
<tr>
<td>Cla</td>
<td>Antrim Plateau Volcanics Massive and vesicular basalt, minor agglomerate</td>
</tr>
<tr>
<td>Pth</td>
<td>Hinde Dolomite and minor limestone, dolomitic siltstone</td>
</tr>
</tbody>
</table>

SLR-D0708 5
Pts  Stray Creek  Flaggy quartz sandstone, green siltstone and shale, dolomitic in places
Sandstone

Ptd  Depot Creek  Massive cross-bedded quartz sandstone, Sandstone  pebble bands

Pfb  Burrell Crk  Greywacke, siltstone, shale, minor Formation  conglomerate, rare argillite and felsic volcanics

FIGURE 2: Geology of Tipperary Station
3. LANDFORM

Landform can be considered a more detailed breakdown of the previous discussion on geology. Tipperary Station has been summarised into five landform classes, each with characteristic features. The distribution of these areas is illustrated in Figure 3.

Elevated Rugged Terrain (200m ASL)

There are two distinct types of rugged terrain. In the north-east corner are the mesas. These consist of high level relatively flat plateau surfaces (1a) flanked by steep slopes (2a, 2b).

The range on the western boundary and Rock Candy Range differ markedly from the mesas. They consist of massive predominantly quartz sandstone formations which are dissected and fractured along joints. These areas are also designated 2a and 2b.

Rugged Low Hills and Low Plateaux (80-100m ASL)

These areas are concentrated largely in a band north of Rock Candy Range. The plateaux (2f) are found only on the Antrim Plateau Volcanics. Hills are situated largely on the Waterbag Creek Formation but also on other geology of minor occurrence (Chapter 2).

Outcropping rock, predominantly siltstone, limestone and sandstone is characteristic of these areas, and are represented by land units 2b, 2c and 2e.
Undulating Terrain

The undulating terrain predominates over the eastern two-thirds of the station. The 3 and 5 land units are very common and outcropping limestone and siltstone frequently occurs. Sinkholes are also a common feature.

Where undulating terrain abuts rugged terrain there appears to have been influence by colluvial activity. These areas are characteristically very stoney and rocky from material that has aggraded from the more elevated rugged areas. Relatively large areas are found abutting the range on the western boundary and smaller areas around Rock Candy Range.

Clay Plains

The clay plains occur in association with the undulating terrain. Usually these occur as broad drainage flats and backswamps. Some large areas towards the centre of the station have extensive limestone outcrop. A sizeable area of clay soils occurs as undulating terrain (6a).

River and Creek Alluvials

The Daly River is the southern boundary of Tipperary Station. Associated with the river are characteristic landform types. Relatively narrow levees (8a, 8b) commonly flank the river. In some areas these are unstable (8e) due to seasonal streambank disturbance from flooding or where tributary creeks enter the river.

Behind the levee areas in a system of swamps and backplains (8d). These areas contain billabongs from the river's previous course and are seasonally inundated.
A number of drainage lines such as Green Ant, Hayward and Station Creeks occur on the Station. These are tributaries of the Daly River and are commonly represented by land units 7b, 7c and 7e.

1. Elevated Rugged Terrain
2. Rugged Low Hills and Low Plateaux
3. Undulating Terrain
4. Clay Plains
5. River and Creek Alluvials

Figure 3: Landforms of Tipperary Station
4. LAND UNITS

4.1 Introduction

The mapping of land units aims to classify the landscape continuum into areas with relatively uniform biophysical attributes. The methodology of land unit mapping relies on the recognition of landform and native vegetation, patterns on aerial photography. Differences in vegetation patterns reflect variations in soil characteristics. Where areas have been cleared this method loses accuracy as the clarity of boundaries between photopatterns is lost.

The land unit classification used is that described by Aldrick and Robinson (1972). Additional units described by Aldrick (1984) have also been extended to this area. In some instances areas have been given a combined land unit designation (e.g. 5ml/5g). In such cases it has been impractical to separate the land into two components because the separate areas may be too small to delineate, or the area has attributes from each of the land unit descriptions.
4.2 Land Unit Descriptions

**High Level Plateaux**

**LAND UNIT la.**

<table>
<thead>
<tr>
<th>Landform</th>
<th>Flat to gently sloping with marginal rocky slopes up to 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils</td>
<td>Generally shallow Cockatoo and Lateritic Podzolics with frequent outcrop of laterite or sandstone</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Open forest <em>(E. miniata, E. tetradonta, E. bleezeri)</em>; frequently dense understorey shrubs; and Spinifex/annual Sorghum.</td>
</tr>
<tr>
<td>Limitations</td>
<td>Rocky, shallow soils.</td>
</tr>
<tr>
<td>Potential Land Use</td>
<td>Mainly inaccessible; very limited rough grazing; watershed protection.</td>
</tr>
<tr>
<td>Extent:</td>
<td>17.3 km².</td>
</tr>
</tbody>
</table>
Rugged Terrain

LAND UNIT 2a

Landform : Rugged terrain with slopes in general greater than 40%; boulder strewn slopes and rocky crests.

Soils : Lithosols very shallow with outcrop.

Vegetation : Very variable, but general occurrence of *E. dichromophloia* and, in lower rainfall areas, *E. umbrawarrensis* and Lancewood; Spinifex and annual Sorghum.

Limitations : Shallow rocky soils.

Potential Land Use : Usually inaccessible; watershed protection; catchment reserves; wildlife refuges; unsuitable for pastoral production.

Extent : 244.2 km².
**LAND UNIT 2b**

<table>
<thead>
<tr>
<th><strong>Landform</strong></th>
<th>Rugged terrain, with slopes 15-40%, frequent rock outcrop.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Soils</strong></td>
<td>Lithosols</td>
</tr>
<tr>
<td><strong>Vegetation</strong></td>
<td>Sparse due to major rock outcrop. Occasional trees (E. miniata) and shrubs (Livistona humilis, Cycas armstrongii and Planchonia careya). Grasses quite dense, the main species being Heteropogon contortus and Themeda australis.</td>
</tr>
<tr>
<td><strong>Limitations</strong></td>
<td>Excessive slope, shallow soils, rock outcrop.</td>
</tr>
<tr>
<td><strong>Potential Land Use</strong></td>
<td>Not suitable for development.</td>
</tr>
<tr>
<td><strong>Extent</strong></td>
<td>Combined with 2a.</td>
</tr>
</tbody>
</table>
LAND UNIT 2c

Landform : Hilly terrain, slopes 5-15%, frequent rock outcrop.

Soils : Lithosols.

Vegetation : Open Forest to Woodland with *E. miniata* and *E. tectifica* the dominant species. *E. foelscheana* occurs widely in the secondary tree layer. Shrub species are various and scattered, grasses include *Chrysopogon* spp. and *Heteropogon triticeus*.

Limitations : Excessive slope, shallow soils, rock outcrop.

Potential Land Use : Limited rough grazing.

Extent : 102.6 km$^2$. 
<table>
<thead>
<tr>
<th>Landform</th>
<th>Low hills and slopes of 3%-10%, rocky and boulder strewn.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils</td>
<td>Generally Lithosols, with small areas of dark Cracking Clays. Usually stony and uneven.</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Low open woodland of <em>Terminalia canescens</em> and other <em>Terminalia</em> species; some <em>Melaleuca nervosa</em>. Mainly perennial grasses.</td>
</tr>
<tr>
<td>Limitations</td>
<td>Shallow rocky soils; sloping, broken relief.</td>
</tr>
<tr>
<td>Potential Land Use</td>
<td>Poor rough grazing.</td>
</tr>
<tr>
<td>Extent</td>
<td>14.0 km².</td>
</tr>
</tbody>
</table>
Flat to Gently Undulating Terrain

LAND UNIT 2e

Landform : Gently undulating crests and upper slopes, slopes to 5%.

Soils : Lithosols, shallow and gravelly, or sandy with sandstone or laterite exposure.

Vegetation : Mainly Open Woodland with some Woodland dominated by *E. tectifica* in association with *E. clavigera* or Ironwood. Dense ground cover of grasses including *Chrysopogon latifolius*, *Themeda australis* and *Eragostis* sp. with localized occurrence of *Schizachyrium fragile*.

Limitations : Shallow soils, rock outcrop.

Potential Land Use : Rough grazing

Extent : 108.6 km².
LAND UNIT 3a

Landform: Very gentle slopes less than 2% on Kimyan and Wriggley; undulating and dissected terrain on Tagoman; severe limestone pavement or outcrop on Kimbyan and Wriggley; frequent linear outcrops of intermixed limestone and sandstone on Tagoman.

Soils: Small pockets of very shallow Red E. tectifica, E. foelscheana) with frequently a well-developed understory of Hakea arborescens and Cochlospermum fraseri; annual Sorghum sp. and perennial grasses.

Limitations: Severe rock outcrop; shallow soils in small pockets, high erodible on Tagoman.

Potential Land Use: Limited rough grazing.

Extent: 7.1 km²
LAND UNIT 3b

**Landform**
- Very gentle slopes (less than 2%). Extensive rock outcrop.

**Soils**
- Pockets of deeper red earths between rock outcrop.

**Vegetation**
- Woodland to Open Woodland dominated by *E. miniata*; the tree substory consists mainly of Ironwood, *E. foelscheana* and *E. confertiflora*. Grasses include *Sesima nervosum* and *Heteropogon triticeus*.

**Limitations**
- Rock outcrop, soil depth.

**Potential Land Use**
- Rough grazing.

**Extent**
- 52.0 km².
LAND UNIT 3c

Landform: Flat to gently sloping, (slopes less than 2%), with scattered limestone outcrop (less than 5%).

Soils: Loamy red earths, deep with minor outcrop, or moderately deep with gravel, or stone.

Vegetation: Variable Open Forest (E. miniata) to Low Open Forest (E. confertiflora and E. foelscheana) and Low Woodland (E. tectifica). The secondary tree layer is well developed and contains mainly juveniles of the above and the shrub layer is poorly developed. Grass cover dense, dominated by Sehima nervosum and Heteropogon contortus.

Limitations: Rock outcrop, soil depth in places.

Potential Land Use: Improved pasture, arable where areas of rock and outcrop are able to be identified and isolated.

Extent: 129.8 km².
LAND UNIT 3d (3dp)*

Landform: Broad flat to very gently sloping areas (less than 2%), with indistinct drainage areas.

Soils: Loamy red earths (Tippera and Emu) mainly deeper than 1.5m.

Vegetation: Within the areas designated 3d there appear to be two distinct components:

(i) Predominantly Open Forest with some Woodland. Dominant species are *E. miniata* and *E. tetrodonta*, the secondary tree layer is well developed and is dominated by *E. confertiflora* and *E. foelscheana*. The scrub layer is variable though often not well developed. The main grasses include *Selima nervosum*, *Themeda australis*, *Chrysopogon* spp. and *Sorghum* sp.

(ii) Low Open Forest to Low Woodland dominated by *E. confertiflora* and *E. foelsheana* with *E. tectifica* occurring less frequently, these species were also the main components of a frequently dense understory. The main grasses are *Selima nervosum* and *Heteropogon contortus*. 
Limitations: Erodible, possible surface sealing.

Potential Land Use: Arable, wet season cash crops with the implementation of soil conservation structures.

Extent: 169.4 km².

* Areas designated 3dp have possible drainage restrictions.
LAND UNIT 3d2

Landform : Flats, often lower slopes and drainage floors undulating with short and variable slopes.

Soils : Red Earths - Emu family, often shallow.

Vegetation : As for 3d on lower slopes; *E. miniata* open forest with perennial grasses including *Coelorhachis* and *Heteropogon triticeus* on drainage floors.

Limitations : Small, scattered areas, possible surface scalding. Very erodible on slopes.

Potential Land Use : Arable if level, otherwise grazing of native or improved pastures.

Extent : 1.2 km².
LAND UNIT 3e

Landform: Undulating terrain with slopes up to 5%; generally at distinct breaks of slope or at heads of drainage systems; frequently used by cattle and horses for camp sites.

Soils: Loamy Red Earths usually shallow and eroded.

Vegetation: Low very open woodland with many dead trees; sparse perennial grasses and Brachyachne sp., frequent bare areas and gullies.

Limitations: Very erodible; small, scattered areas.

Potential Land Use: Rough grazing; possibly improvable.

Extent: 15.5 km².
LAND UNIT 3f

**Landform**: Flat to gently sloping (less than 2%). These areas are generally associated with land unit 3d.

**Soils**: Loamy mottled yellow earths (Elliot).

**Vegetation**: Low Open Woodland to Woodland with trees consisting of *E. confertiflora*, *E. foelscheana* and *E. tectifica*, and grasses dominated by *Heteropogon contortus* and *H. triticeus*.

**Limitations**: Possible drainage restrictions and poor trafficability in the wet season.

**Extent**: 15.0 km².
<table>
<thead>
<tr>
<th><strong>LAND UNIT 3i</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landform</strong></td>
</tr>
<tr>
<td><strong>Soils</strong></td>
</tr>
<tr>
<td><strong>Vegetation</strong></td>
</tr>
<tr>
<td><strong>Limitations</strong></td>
</tr>
<tr>
<td><strong>Potential Land Use</strong></td>
</tr>
<tr>
<td><strong>Extent</strong></td>
</tr>
</tbody>
</table>
LAND UNIT 4a (4a1 has a firm surface, 4a2 has a soft surface)

Landform : Long gentle slopes (less than 2%)

Soils : Sandy red earth; loamy sand surface to light clay at depth (Blain)

Vegetation : *E. tetrodonta*/*E. miniata* Woodland with *E. confertiflora*, *E. foelscheana* and *E. tectifica* forming the secondary tree layer. Shrubs are poorly represented and grasses are relatively sparse.

Limitations : Clearing and cultivation could lead to both sheet and wind erosion if soil conservation measures are not applied.

Potential Land Use : Similar to 3d.

Extent : 13.6 km².
LAND UNIT 4b1

Landform : Broad drainage floors up to half a mile wide and with longitudinal slopes of up to 2%. Occasional sandstone outcrop.

Soils : Deep loamy Red Earths with firm surface horizons of sandy loam to sandy clay loam.

Vegetation : Open forest almost exclusively dominated by tall E. tetradonta (up to 80 ft) with subordinate Ironwood and E. foelscheana; predominantly perennial grasses (Sehima).

Limitations : Subject to severe erosion if cultivated; probable surface sealing sucker regrowth problems.

Potential Land Use : Arable but favouring deep-rooted crops.

Extent : 8.4 km².
LAND UNIT 4b2

Landform : Lower slopes and floors in gently undulating terrain; slopes up to 3%; occasional sandstone outcrop.

Soils : Deep Sandy Red Earths with soft surface horizons of sand to loamy sand (Blain with some Cockatoo).

Vegetation : Open forest dominated by *E. tetradonta* with some *E. miniata*, subordinate Ironwood and *E. foelscheana*; dominant annual *Sorghum*; occasional Spinifex in the south.

Limitations : Subject to periods of severe water stress; moderately erodible on steeper slopes; severely erodible if cleared and cultivated.

Potential Land Use : Mainly suitable for improved pastures; generally non-arable.

Extent : 14.0 km².
LAND UNIT 4c

Landform : Gently undulating terrain often adjoining, or at least close to river backplains, slopes up to 3%; often slight limestone outcrop at breaks of slope.

Soils : Deep sandy Red Earths with sand or loamy sand surfaces (Venn with some Blain).

Vegetation : Woodland to open forest dominated by Erythrophleum chlorostachys, E. tetrodonta and E. papuana large well-formed trees, rather widely spaced with much Lysiphyllum sp. understory; mixed perennial grasses and annual Sorghum sp.

Limitations : Subject to severe erosion if disturbed; probable water stress and surface sealing problems; slight rock.

Potential Land Use : Improved pastures with selective clearing.

Extent : 21.8 km².
LAND UNIT 4c1

Landform : Gently undulating terrain adjoining river backplains or old river channels, slopes up to 5%; some ferruginous outcrops at breaks of slope.

Soils : Deep sandy Red Earths with sand to sandy loam surfaces (Venn, with some Blain).

Vegetation : Open forest dominated by E. papuana and Gyrocarpus americanus, large well-formed trees rather widely spaced, with some Erythrophleum chlorostachys, Brachychiton diversifolius, Canarium australianum and Acacia. Mixed perennial grasses and annual Sorghum sp. and Hyptis suaveolens.

Limitations : Subject to severe erosion if disturbed; probable water stress and surface sealing problems; slight rock.

Potential Land Use : Improved pastures on lower slopes with selective clearing.

Extent : 0.7 km².
LAND UNIT 4d

Landform : Upper and middle slopes in undulating terrain; slopes up to 5%, occasionally up to 8%.

Soils : Mainly deep Earthy Sands (Cockatoo), sometimes light Sandy Red Earths (Blain) and Siliceous Sands (Cypress); often occurs in association with Claravale soils.

Vegetation : Open forest dominated by *E. tetradonta* with *E. miniata* with a frequently very dense shrub layer of *Acacia* and *Petalostigma*; pastures dominated by annual Sorghum and Spinifex.

Limitations : Severe water stress; very loose sandy surface; highly erodible.

Potential Land Use: Mainly rough grazing; largely unimprovable; lacking natural stock waters; possible forestry use.

Extent : 24.8 km².
LAND UNIT 4dl

Landform : Lower slopes and floors generally associated with areas of strong relief.

Soils : Siliceous Sands (Cypress) with some Earthy sands.

Vegetation : Open forest dominated by E. tetradonta with E. miniata with a frequently very dense shrub layer of Acacia and Petalostigma; pastures dominated by annual Sorghum and Spinifex.

Limitations : Very severe water stress; extremely loose and boggy sandy surface; highly erodible; very infertile.

Potential Land Use : Very limited rough grazing.

Extent : 1.7 km².
LAND UNIT 5a

Landform : Mainly crests and upper slopes up to 4%; frequent outcrops on crests.

Soils : Lateritic Podzolics; some Siliceous and Earthy sands.

Vegetation : Open forest usually dominated by E. miniata with Spinifex and annual Sorghum pasture and frequently a well-developed shrub layer.

Limitations : Very low waterholding capacity; erodible on slopes steeper than 1% if the surface is disturbed; very loose soil surface; very infertile.

Potential Land Use : Mainly rough grazing; some slight improvement might be possible on flatter areas; lacking natural stock waters.

Extent : 16.7 km$^2$. 
LAND UNIT 5c

Landform: Either valley floors or low-lying seepage areas in sandy country; frequently abutt drainage lines or backplains.

Soils: Siliceous Sands (Stray), alluvial Red Earths (Umbrarwarra) and Yellow Podzolics (Douglas), the latter on flattest areas.

Vegetation: Scattered tall E. polycarpa with extensive open treeless areas. In drainage floors dense Melaleuca and Grevillea pteridifolia scrub. In the outwash areas scattered G. pteridifolia and Verticordia with short annual grasses and low sedges.

Limitations: Very wet and untrafficable in the wet season; highly erodible if disturbed.

Potential Land Use: Very poor rough grazing, may provide a green pick later in the dry season than most areas; may be improvable in parts but drainage floors should be treated as grassed waterways.

Extent: 51.1 km².
LAND UNIT 5d

Landform : Undulating terrain, slopes generally less than 3%.

Soils : Lateritic and Yellow Podzolics.

Vegetation : Low Woodland to Shrubland with species including *Tristania grandiflora*, *Eucalyptus grandifolia* and *Brachychiton diversifolium* with dense understory of *Melaleuca viridiflora* and *Petalostigma pubescens*. Grasses consist mainly of annual *sorghum* and *Themeda australis*.

Limitations : Erodible soils, poor soil drainage and gravel content.

Potential Land Use : Non-arable, dry season grazing of improved or native pastures.

Extent : 154.2 km².
LAND UNIT 5e

Landform : Flat to gently sloping (less than 1%).

Soils : Predominantly Yellow Podzolics.

Vegetation : Very similar to the Low Woodland and Low Open Forest of land unit 3d2 although there are minor occurrences of Open Forest in this unit. Species composition tends to be very similar to 3d2 also. The grasses *Themeda australis* and *Heteropogon triticeus* are important in this unit.

Limitations : Poor drainage and trafficability in the wet season.

Potential Land Use : Good potential for improved pasture, with the possibility of fodder crop production.

Extent : 76.7 km².
LAND UNIT 5f1

Landform : Undulating terrain; slopes less than 4%.

Soils : Variable, shallow and poorly drained Yellow Podzolics (mainly Ejong, some Lateritic Podzolics).

Vegetation : Tall shrubland with scattered low emergent trees (E. latifolia, E. tectifica, E. alba E. tetradora); shrub species very variable; mainly rather poor annual Sorghum pastures.

Limitations : Very shallow, droughty and poorly drained soils of low fertility, very erodible if disturbed.

Potential Land Use : Well supplied with large creeks with almost perennial waterholes, such that low quality improved pastures could be considered with careful stock management.

Extent : 0.7 km².
<table>
<thead>
<tr>
<th>LAND UNIT 5f2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landform</strong></td>
</tr>
<tr>
<td><strong>Soils</strong></td>
</tr>
<tr>
<td><strong>Vegetation</strong></td>
</tr>
<tr>
<td><strong>Limitations</strong></td>
</tr>
<tr>
<td><strong>Potential Land Use</strong></td>
</tr>
<tr>
<td><strong>Extent</strong></td>
</tr>
</tbody>
</table>
LAND UNIT 5g

Landform : Undulating terrain; slopes up to 4%.

Soils : Predominantly Yellow Podzolics.

Vegetation : Woodland of Ironwood and *E. tectifica*. Secondary tree and shrub layers poorly developed, the grasses moderately dense and consist mainly of *Chrysopogon latifolius*.

Limitations : Slope, gravel content of soils, soil erodibility.

Potential Land Use : Dry season grazing of native or improved pasture.

Extent : 33.9 km$^2$. 
LAND UNIT 5k

Landform : Gently undulating with slopes up to 3%. Minor flat areas below breaks of slope.

Soils : Lateritic Podzolics (Jindare series 3) with sandy gravelly A horizons and reddish loamy subsoils. Minor Red Earths.


Limitations : Minor drainage impedance; sandy gravelly topsoils; uneven relief; erodible.

Potential Land Use : Non-arable, dry season grazing of improved or native pastures.

Extent : 5.3 km².
**LAND UNIT 5m1**

<table>
<thead>
<tr>
<th>Landform</th>
<th>Slopes of up to 4%, waning distally; structural ledges at breaks of slope; colluviated pediments below land units 2a, 2b and 2c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils</td>
<td>Lateritic Podzolics (Jindare) and Yellow Podzolics (Ejong), usually shallow and gravelly, often ill-drained.</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Woodland to low woodland of <em>E. tectifica</em> and <em>E. foeilsheana</em> with minor other communities. Dominantly annual grasses.</td>
</tr>
<tr>
<td>Limitations</td>
<td>Highly erodible slopes; rocky at intervals; shallow gravelly soils; often ill-drained.</td>
</tr>
<tr>
<td>Potential Land Use</td>
<td>Non-arable; dry season grazing of improved or native pastures.</td>
</tr>
<tr>
<td>Extent</td>
<td>17.8 km².</td>
</tr>
<tr>
<td><strong>LAND UNIT 6a</strong></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Landform</strong></td>
<td>Undulating terrain; slopes up to 5% rarely to 10%; generally associated with rugged terrain.</td>
</tr>
<tr>
<td><strong>Soils</strong></td>
<td>Grey and Brown Clays (Banyan and Cununurra) with surface stone.</td>
</tr>
<tr>
<td><strong>Vegetation</strong></td>
<td>Mainly <em>Sorghum plumosum</em> grassland with scattered trees; small patches of <em>Terminalia platyptera</em> and <em>T. canescens</em> shrubland.</td>
</tr>
<tr>
<td><strong>Limitations</strong></td>
<td>Highly erodible, stony and strongly gilgaied.</td>
</tr>
<tr>
<td><strong>Potential Land Use</strong></td>
<td>Rough grazing.</td>
</tr>
<tr>
<td><strong>Extent</strong></td>
<td>12.0 km².</td>
</tr>
<tr>
<td>Landform</td>
<td>Almost flat plains with endoreic drainage; ponded in the wet season.</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Soils</td>
<td>Grey and Brown Clays (Banyan and Cununurra), usually the more poorly drained series.</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Tall shrubland dominated by <em>Melaleuca</em> and <em>Terminalia platypera</em>; tall perennial grasses, with sedges in depressions.</td>
</tr>
<tr>
<td>Limitations</td>
<td>Strongly gilgaied; very poorly drained; periodically subjected to shallow inundation.</td>
</tr>
<tr>
<td>Potential Land Use</td>
<td>Limited dry-season rough grazing.</td>
</tr>
<tr>
<td>Extent</td>
<td>4.3 km².</td>
</tr>
</tbody>
</table>
### Tributary Creeks, Drainage Floors and Backplains

#### LAND UNIT 6f

<table>
<thead>
<tr>
<th>Landform</th>
<th>Almost flat plains with considerable microrelief.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils</td>
<td>Olive Cracking Clays with deep broad gilgai; siliceous and calcareous gravel on mounds; often dark Cracking Clays in depressions.</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Woodland or open woodland of <em>Melaleuca minutifolia</em> with sparse <em>Carissa lanceolata</em>. <em>E. microtheca</em> occurs in some areas.</td>
</tr>
<tr>
<td>Limitations</td>
<td>Poor drainage; deeply gilgaied; inundation of gilgai depressions in wet season; variable, patterned soils of heavy texture.</td>
</tr>
<tr>
<td>Potential Land Use</td>
<td>Rough grazing of improved pasture, or improved pasture species tolerant to water logging.</td>
</tr>
<tr>
<td>Extent</td>
<td>1.0 km².</td>
</tr>
</tbody>
</table>

SLR-D0708 44
LAND UNIT 7a1

<table>
<thead>
<tr>
<th>Landform</th>
<th>River backplains or tributary drainage flats.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils</td>
<td>Grey and Brown Clays (Banyan with some Cununurra and Coolibah).</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Grassland (predominantly frontage grasses) or very open woodland (<em>E. papuana</em> and <em>Terminalia carpentariae</em>).</td>
</tr>
<tr>
<td>Limitations</td>
<td>Poor drainage; subject to occasional flooding; moderate gilgai in places; usually alkaline sub-soils.</td>
</tr>
<tr>
<td>Potential Land Use</td>
<td>At present only rough grazing; pasture improvement given suitable pasture species may be practicable in the future; irrigated pastures may be possible but further study is required.</td>
</tr>
<tr>
<td>Extent</td>
<td>158.5 km².</td>
</tr>
</tbody>
</table>
LAND UNIT 7a2

Landform: Slightly elevated areas of major river back plains, and drainage floors in the lower reaches of some tributary creeks.

Soils: Grey and Brown Clays (Coolibah with some Banyan).

Vegetation: Woodland (E. tectifica, E. grandifolia and Lophostemon) with perennial grasses; increasing E. papuana and weed species close to main rivers; tributary drainage floors have very scattered trees (E. papuana) with very dense perennial grasses usually dominated by Themeda australis.

Limitations: Poor drainage; isolated at times by floodwaters.

Potential Land Use: Marginally arable suitable for improved pastures.

Extent: 44.5 km².
LAND UNIT 7a3

Landform : Almost flat plains up to one mile wide, scattered limestone outcrop may be present.

Soils : Grey, brown and red clays.

Vegetation : Woodland or Open-Woodland with *Tristaria grandiflora* and *E. papuana*, understory of *Terminalia platyphylla* and *Planchonia careya* and grasses consisting of *Panicum trachyrhachis* and annual Sorghum.

Limitations : Very poor drainage, restricted trafficability in the wet season.

Potential Land Use: Rough grazing of native pasture, or improved pasture species tolerant to waterlogging.

Extent : 5.3 km².
LAND UNIT 7b

Landform : Drainage lines with transverse slopes up to 1%, may be channelled but the channel is small and well defined, occasional small high-level plains.

Soils : Yellow Podzolics and Gleyed Podzolics (Florina and Marrakai).

Vegetation : Woodland of *Tristania grandiflora* with minor occurrence of *E. papuana* and *E. polycarpa*. Grasses various and include *Capillipedium parviflorum* and annual Sorghum.

Limitations : Poor drainage, erodible.

Potential Land Use : Water disposal areas, stock access to these areas should be strictly controlled.

Extent : 6.9 km².
LAND UNIT 7c

Landform : Ill-defined depositional drainage lines; rare channels, intermittent and ill-defined.

Soils : Alluvial soils - immature and unstable sandy alluvium with small areas of Marrakai, Ejong and Douglas.

Vegetation : Extremely variable; frequent occurrence of Melaleuca scrub.

Limitations : Highly erodible and prone to flooding and flood deposition.

Potential Land Use : Strictly controlled rough grazing; permanent grassed waterways.

Extent : 15.1 km$^2$. 
LAND UNIT 7d

**Landform**: Broad drainage flats or seasonally ponded areas with very slight slopes; rarely channelled.

**Soils**: Loamy Red Earths (Tippera) with alluvial and colluvial surface horizons.

**Vegetation**: Woodland (E. papuana, E. grandifolia, E. foelscheana) with dense perennial grasses (Themeda, Coelorhachis).

**Limitations**: Highly erodible if disturbed; subject to periods of surface water flow.

**Potential Land Use**: Grassed waterways; useful grazing which should be strictly controlled; should not be cleared or cultivated.

**Extent**: 59.5 km².
<table>
<thead>
<tr>
<th>Landform</th>
<th>Broad drainage flats or temporarily ponded areas with very slight slopes, rarely channelled.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils</td>
<td>Yellow Earths with colluvial surface horizons.</td>
</tr>
<tr>
<td>Vegetation</td>
<td>Grassland dominated by <em>Chrysopogon</em> sp., <em>Heteropogon triticeus</em> and annual Sorghum. (Further details of species composition are not available due to the badly burnt nature of the area at the time of survey). Emergents include <em>Terminalia</em> sp. and <em>Tristania lactiflua</em>.</td>
</tr>
<tr>
<td>Limitations</td>
<td>Poor drainage, poor trafficability during the wet season.</td>
</tr>
<tr>
<td>Potential Land Use</td>
<td>Water disposal areas, with strictly controlled grazing.</td>
</tr>
<tr>
<td>Extent</td>
<td>5.9 km².</td>
</tr>
</tbody>
</table>
LAND UNIT 7e

Landform : Major creeks and severely gullied tributaries; contain permanent and ephemeral water supplies; severe risk of erosion, particularly headward gully ing, at access points; careful control and regulation of stock numbers at these water points is necessary.

Extent : 66.5 km².
Major River Alluvials

LAND UNIT 8a

Landform : Younger river levees with back slopes up to 6% where the levee is narrow, 2-3% where wider; rarely over 65 m wide.

Soils : Alluvial Red Earths (Manbulloo and Daly); occasional rock (quartzite) outcrop indicates shallow soils in areas traversing sandy land systems.

Vegetation : Variable woodland or open forest with *E. papuana* a frequent species; generally short annual grasses infested more or less badly with weeds (*Hyptis suaveolens, Acanthospermum hispidum*).

Limitations : Weeds; high erosion risk on steeper slopes, stream bank erosion on river side of unit; low waterholding capacity; frequent risk of isolation by floodwaters.

Potential Land Use: Arable for crops and pastures and suitable for irrigation.

Extent : 3.3 km².
LAND UNIT 8b

Landform : Younger river levees with backslopes rarely in excess of 2%; up to half a mile wide.

Soils : Alluvial Red Earths (Katherine, Edith); deep.

Vegetation : Open forest dominated by *E. papuana* usually with dense understorey of *Acacia aulacocarpa*, *Melaleuca viridiflora* and *Tristainia grandiflora*. Usually dense litter layer with *Cynodon dactylon*.

Limitations : Weeds; slight erosion risk, with stream bank erosion; occasional flooding possible.

Potential Land Use : Arable for crops or pastures and suitable for irrigation.

Extent : 21.0 km².
LAN D UNIT 8c

Landform : Low-lying areas behind the younger levees, older levees, or minor drainage floors within the younger levees; slopes generally very slight.

Soils : Alluvial Red Earths (Belbowie, or poorly drained phases of Katherine and Edith).

Vegetation : Woodland (E. foelsheana, E. patellaris) with dense perennial grasses (Themeda australis).

Limitations : Drainage impedance; flooding and possibly periods of inundation; levee drainage floors high erodible.

Potential Land Use : Arable if extensive and flat, but more suited for fodder crops or improved pasture.

Extent : 6.2 km².
LAND UNIT 8d

Swamps, more or less permanent, either paperbark or freshwater mangrove with *Eleocharis* sp. and *Oryza* sp.

Extent : 31.2 km².

LAND UNIT 8e

All severely eroded areas associated with the major river alluviums. These are usually deep and active gully systems.

Extent : 10.5 km².
Table 2: Land Unit Areas of Tipperary Station

<table>
<thead>
<tr>
<th>LAND UNIT</th>
<th>AREA (KM²)</th>
<th>LAND UNIT</th>
<th>AREA (KM²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>17.3</td>
<td>6a</td>
<td>12.0</td>
</tr>
<tr>
<td>2a/2b</td>
<td>244.2</td>
<td>6c</td>
<td>4.3</td>
</tr>
<tr>
<td>2c</td>
<td>102.6</td>
<td>6f</td>
<td>1.0</td>
</tr>
<tr>
<td>2e</td>
<td>108.6</td>
<td>7a1</td>
<td>158.5</td>
</tr>
<tr>
<td>2f</td>
<td>14.0</td>
<td>7a2</td>
<td>44.5</td>
</tr>
<tr>
<td>3a</td>
<td>7.1</td>
<td>7a3</td>
<td>5.3</td>
</tr>
<tr>
<td>3b</td>
<td>52.0</td>
<td>7b</td>
<td>6.9</td>
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<tr>
<td>3c</td>
<td>129.8</td>
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<td>15.1</td>
</tr>
<tr>
<td>3d</td>
<td>169.4</td>
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<td>59.5</td>
</tr>
<tr>
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<td>1.2</td>
<td>7d1</td>
<td>5.9</td>
</tr>
<tr>
<td>3e</td>
<td>15.5</td>
<td>7e</td>
<td>66.5</td>
</tr>
<tr>
<td>3f</td>
<td>15.0</td>
<td>8a</td>
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</tr>
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<td>3i</td>
<td>0.4</td>
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<td>21.0</td>
</tr>
<tr>
<td>4a1</td>
<td>5.7</td>
<td>8c</td>
<td>6.2</td>
</tr>
<tr>
<td>4a2</td>
<td>7.9</td>
<td>8d</td>
<td>31.2</td>
</tr>
<tr>
<td>4b1</td>
<td>8.4</td>
<td>8e</td>
<td>10.5</td>
</tr>
<tr>
<td>4b2</td>
<td>14.0</td>
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<td></td>
</tr>
<tr>
<td>4c</td>
<td>21.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4c1</td>
<td>0.7</td>
<td></td>
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</tr>
<tr>
<td>4d</td>
<td>24.8</td>
<td></td>
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</tr>
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<td>1.7</td>
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</tr>
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<td>16.7</td>
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<td></td>
</tr>
<tr>
<td>5c</td>
<td>51.1</td>
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</tr>
<tr>
<td>5d</td>
<td>154.2</td>
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</tr>
<tr>
<td>5e</td>
<td>76.7</td>
<td></td>
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</tr>
<tr>
<td>5f1</td>
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</tr>
<tr>
<td>5f2</td>
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<td></td>
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</tr>
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<td>5g</td>
<td>33.9</td>
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</tr>
<tr>
<td>5k</td>
<td>5.3</td>
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<tr>
<td>5m1</td>
<td>17.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.0 REFERENCES


