Fitzroy region Grazing Land Management land type information

Plant Index

Common name	Species name	Page
bottlewasher grasses	*Enneapogon* spp.	FT02, FT04, FT12, FT14, FT15, FT17, FT19, FT20, FT21, FT22, FT23, FT24, FT25, FT28, FT30, FT31
brigalow	*Acacia harpophylla*	FT01, FT04, FT05, FT06, FT11, FT23, FT24, FT26
brigalow grass	*Paspalidium caespitosum*	FT04, FT06, FT17, FT20, FT21, FT22, FT24, FT29
broad-leaved teatree	*Melaleuca* spp.	FT08
	Melaleuca viridiflora	FT10
buck spinifex	*Triodia mitchellii*	FT27, FT31
buffel grass*	*Pennisetum ciliare (*formerly *Cenchrus ciliaris*)	FT01, FT02, FT03, FT04, FT05, FT06, FT11, FT13, FT22, FT24, FT25, FT26, FT28, FT29
bull Mitchell grass	*Astrebla squarrosa*	FT01, FT04, FT05, FT06, FT11, FT23
bulloak	*Allocasuarina luehmannii*	FT07, FT10, FT22
butterfly pea*	*Clitoria ternatea*	FT01, FT02, FT03, FT04, FT05, FT06, FT11, FT19, FT23, FT28, FT29
button grass	*Dactyloctenium radulans*	FT01, FT02, FT05, FT11, FT12, FT13, FT19, FT20, FT21
Byfield vanilla lily	*Sowerbaea subtilis*	FT10
Caatinga stylo*	*Stylosanthes seabrana*	FT01, FT02, FT03, FT04, FT05, FT06, FT08, FT11, FT13, FT14, FT15, FT19, FT23, FT29
cabbage palm	*Livistona australis*	FT10
Caribbean stylo*	*Stylosanthes hamata* (cvv. Amiga, Verano)	FT04, FT03, FT05, FT06, FT08, FT09, FT10, FT13, FT14, FT15, FT16, FT19, FT20, FT22, FT24, FT25, FT26, FT28
caster oil plant*	*Ricinus communis*	FT02
channel millet	*Echinochloa turneriana*	FT08
Clarkson's bloodwood	*Corymbia clarksoniana*	FT07, FT12, FT25
coast banksia	*Banksia integrifolia*	FT09
comet grass	*Perotis rara*	FT03, FT12, FT15, FT17, FT28
coolibah	*Eucalyptus coolabah*	FT01, FT02, FT11
coolibah grass	*Thellungia advena*	FT02, FT23

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corkwood wattle	*Acacia bidwillii*	FT19
cotton panic	*Digitaria brownii*	FT03, FT12, FT14, FT17, FT19, FT24, FT25, FT31, FT26
couch grass	*Cynodon dactylon*	FT08, FT11
creeping bluegrass*	*Bothriochloa insculpta* (cvv. Bisset)	FT02, FT03, FT04, FT06, FT08, FT09, FT10, FT13, FT16, FT25, FT26, FT28, FT29
croton	*Croton insularis*	FT29
Crow's ash	*Flindersia australis*	FT06, FT29
crowsfoot grass	*Eleusine indica*	FT08
curly Mitchell grass	*Astrebla lappacea*	FT01, FT05, FT06, FT11, FT23
curly windmill grass	*Enteropogon acicularis*	FT01, FT02, FT03, FT04, FT06, FT11, FT14, FT17, FT19, FT20, FT21, FT23, FT24, FT25, FT26
currant bush	*Carissa ovata*	FT01, FT04, FT05, FT06, FT13, FT19, FT20, FT21, FT24, FT25, FT26, FT28, FT29
Cypress pine	*Callitris glaucophylla*	FT12
dark wiregrass	*Aristida calycina*	FT02, FT04, FT13, FT14, FT15, FT17, FT20, FT21, FT22, FT24, FT28, FT30, FT31
dead finish	*Archidendropsis basaltica*	FT28
desert bluegrass	*Bothriochloa ewartiana*	FT02, FT04, FT05, FT06 FT13, FT14, FT15, FT19, FT20, FT21, FT22, FT24, FT25, FT26, FT28, FT30
desert oak	*Acacia coriacea*	FT14, FT28, FT31
Desmanthus*	*Desmanthus virgatus*	FT01, FT02, FT05, FT06, FT08, FT11, FT13, FT23, FT29
digit grass	*Digitaria eriantha* spp. *eriantha* cv. Premier	FT03, FT09,
dysentery bush	*Grewia retusifolia*	FT12
early flowering black wattle	*Acacia leiocalyx*	FT24
early spring grass	*Eriochloa pseudoacrotricha*	FT02, FT08
emu apple	*Owenia acidula*	FT17, FT19

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erect kerosene grass	*Aristida holathera*	FT03, FT14
fairy grass	*Sporobolus caroli*	FT01, FT02, FT04, FT05, FT06, FT11, FT15, FT19, FT20, FT21, FT22, FT23, FT30
false sandalwood	*Eremophila mitchellii*	FT01, FT04, FT05, FT06, FT07, FT24, FT25, FT26, FT28
feathertop wiregrass	*Aristida latifolia*	FT03, FT07, FT14, FT19, FT23, FT27, FT28
finger panic (umbrella) grass	*Digitaria coenicola*	FT14
finger panic grass	*Digitaria* spp.	FT20, FT21
fire grass	*Schizachyrium fragile*	FT09, FT31
five-minute grass	*Tripogon loliiformis*	FT02, FT07, FT08, FT14, FT15, FT20, FT21, FT22, FT24, FT25, FT28, FT30, FT31
flannel weeds	*Sida* spp.	FT03, FT17, FT20, FT21, FT25, FT26, FT28, FT31
Flinders grass	*Iseilema vaginiflorum*	FT02, FT04, FT11, FT19, FT23
forest bluegrass	*Bothriochloa bladhii*	FT01, FT02, FT03, FT04, FT05, FT06, FT08, FT11, FT13, FT16, FT19, FT20, FT21, FT22, FT28
fresh water couch	*Paspalum distichum*	FT18
fringe rush[@]	*Fimbristylis* sp.	FT18
galvanised burr	*Sclerolaena birchii*	FT06, FT24
Gatton panic*	*Panicum maximum*	FT02, FT06, FT08
ghost gum	*Corymbia dalliachana*	FT10, FT13, FT14, FT15, FT20, FT21, FT22, FT24, FT25
giant rat's tail grass*	*Sporobolus pyramidalis*	FT08, FT16, FT26, FT27
giant speargrass	*Heteropogon triticeus*	FT02, FT08, FT09, FT10
golden beard grass	*Chrysopogon fallax*	FT07, FT08, FT10, FT11, FT12, FT14, FT15, FT16, FT20, FT21, FT22, FT24, FT25, FT26, FT30, FT31
grass tree	*Xanthorrhoea johnsonii*	FT09, FT10, FT27
Green panic*	*Panicum maximum* var. *trichoglume*	FT04, FT06, FT08, FT16, FT29

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grevillea	*Grevillea* sp.	FT09
gum topped box	*Eucalyptus moluccana*	FT16
gum-topped bloodwood	*Corymbia* sp.	FT19, FT25
hairy panic	*Panicum effusum*	FT02, FT12, FT13, FT14, FT15, FT17, FT20, FT21, FT22, FT27, FT30, FT31
harrisia cactus*	*Harrisia martini*	FT01, FT03
heartleaf poison bush	*Gastrolobium grandiflorum*	FT31
heath myrtle	*Calytrix* sp.	FT15, FT22
Henderson's bloodwood	*Corymbia hendersonii*	FT15
holly bush	*Alectryon diversifolius*	FT29
hoop Mitchell grass	*Astrebla elymoides*	FT23
hopbush	*Dodonaea* sp.	FT20, FT21
hymenachne*	*Hymenachne amplexicaulis*	FT18
Indian bluegrass*	*Bothriochloa pertusa* cvv. Medway, Keppel	FT09
ironwood	*Acacia excelsa*	FT07, FT17, FT24, FT25, FT25
jericho wiregrass	*Aristida jerichoensis*	FT12, FT31
Jointvetch*	*Aeschynomene* sp.	FT10
kangaroo grass	*Themeda triandra*	FT02, FT03, FT04, FT06, FT08, FT09, FT13, FT14, FT15, FT16, FT19, FT20, FT21, FT22, FT24, FT25, FT26, FT28, FT30, FT31
Keppel bluegrass *see* Indian bluegrass		
kerosene wiregrass	*Aristida contorta*	FT31
king bluegrass	*Dichanthium queenslandicum*	FT23
Koronivia*	*Urochloa humidicola*	FT10
lancewood	*Acacia shirleyi*	FT17, FT22, FT30
lantana*	*Lantana camara*	FT02, FT09, FT29
large bluegrass	*Ischaemum australe*	FT08

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large-fruited bloodwood	*Corymbia plena*	FT15, FT22
Leichhardt bean	*Cassia brewsteri*	FT07, FT13, FT19, FT24, FT25, FT26
lemon scented gum	*Corymbia citriodora*	FT22, FT30
leopardwood	*Flindersia dissosperma*	FT04
leucaena*	*Leucaena leucocephala*	FT01, FT02, FT03, FT04, FT05, FT06, FT11, FT23, FT29
limebush	*Citrus glauca*	FT06, FT19
liverseed grass	*Urochloa panicoides*	FT23
lovegrass/es	*Eragrostis* spp.	FT07, FT08, FT09, FT12, FT14, FT15, FT16, FT17, FT19, FT20, FT21, FT22, FT27, FT29, FT30, FT31
mangrove	many genuses	FT18
many-headed wiregrass	*Aristida caput-medusae*	FT12, FT15, FT17, FT20, FT21, FT22, FT30
marine couch	*Sporobolus virginicus*	FT18
matrush	*Lomandra* sp.	FT02
Medway bluegrass *see* Indian bluegrass		
mimosa*	*Acacia farnesiana*	FT11, FT19, FT23
molasses grass*	*Melinis minutiflora*	FT09
Moreton Bay ash	*Corymbia tessellaris*	FT02, FT03, FT09, FT13, FT15
mother-of-millions*	*Bryophyllum delagoense*	FT01, FT03, FT05
mountain coolibah	*Eucalyptus orgadophila*	FT19, FT23, FT28
mountain wanderrie	*Eriachne mucronata*	FT14
mulga fern	*Cheilanthes* sp.	FT17, FT20, FT21
mulga oats	*Monachather paradoxus*	FT17
myall	*Acacia pendula*	FT06
myrtle	*Psydrax oleifolia*	FT12, FT24
narrow-leaved ironbark	*Eucalyptus crebra*	FT10, FT12, FT14, FT15, FT17, FT20, FT21, FT22, FT25, FT28, FT30

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narrow-leaved tea tree	*Melaleuca* sp.	FT10
native legumes	*Alysicarpus* and *Desmodium* spp.	FT10
native millet	*Panicum decompositum*	FT01, FT04, FT05, FT11, FT13, FT19, FT23, FT25, FT26, FT28
native sorghum	*Sarga leiocladum*	FT08
ooline	*Cadellia pentastylus*	FT06, FT29
orchid	*Habenaria xanthantha*	FT10
pangola*	*Digitaria eriantha*	FT08, FT09, FT10, FT16
paperbark tea tree	*Melaleuca* spp.	FT09, FT15, FT22
para grass*	*Urochloa mutica*	FT08, FT18
parkinsonia*	*Parkinsonia aculeata*	FT01, FT02, FT03, FT11
parthenium*	*Parthenium hysterophorus*	FT01, FT02, FT04, FT05, FT06, FT11, FT13, FT19, FT23, FT24, FT28, FT29
paspalum	*Paspalum* sp.	FT13
pepper grass	*Panicum laevinode*	FT11
pigweed	*Portulaca* sp.	FT26, FT28
pimelea	*Pimelea* sp.	FT12
pink bloodwood	*Corymbia intermedia*	FT08, FT09, FT10, FT22
pitted bluegrass	*Bothriochloa decipiens*	FT04, FT08, FT12, FT14, FT16, FT19, FT20, FT21, FT22, FT24, FT26, FT27, FT28, FT30
plume sorghum	*Sarga plumosum*	FT31
poplar box	*Eucalyptus populnea*	FT02, FT03, FT06, FT07, FT24, FT25, FT26
poplar gum	*Eucalyptus platyphylla*	FT08, FT10
poverty grass	*Eremochloa bimaculata*	FT02, FT10, FT12, FT16, FT17
pretty wattle	*Acacia decora*	FT31
prickly acacia*	*Acacia nilotica*	FT23
prickly pine	*Bursaria incana*	FT14, FT28

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purple lovegrass	*Eragrostis lacunaria*	FT04, FT24, FT25, FT26
purple pigeon grass*	*Setaria incrassata*	FT01, FT05, FT06, FT11, FT23
purpletop chloris*	*Chloris inflata*	FT08
Queensland blue gum	*Eucalyptus tereticornis*	FT03
Queensland bluegrass	*Dichanthium sericeum*	FT01, FT02, FT04, FT05, FT06, FT11, FT13, FT19, FT23, FT28
Queensland peppermint	*Eucalyptus exserta*	FT10, FT17
quinine	*Petalostigma pubescens*	FT07, FT15, FT22, FT24, FT25
rat's tail grass	*Sporobolus* sp.	FT02
red ash	*Alphitonia excelsa*	FT15, FT20, FT21, FT22, FT24, FT30
red bloodwood	*Corymbia erythrophloia*	FT13
red Natal grass*	*Melinis repens*	FT02, FT30
reedgrass	*Arundinella* sp.	FT08, FT16
Rhodes grass*	*Chloris gayana* (cvv. Callide, Katambora)	FT02, FT08, FT09, FT10, FT16, FT29
river red gum	*Eucalyptus camaldulensis*	FT02
roly poly burr	*Sclerolaena* sp.	FT06
rosewood	*Acacia rhodoxylon*	FT17, FT20, FT21, FT22
roundleaf cassia*	*Chamaecrista rotundifolia* cv. Wynn	FT09, FT10
rubbervine*	*Cryptostegia grandiflora*	FT02, FT11, FT29
sabi grass*	*Urochloa mosambicensis*	FT29
sally wattle	*Acacia salicina*	FT01, FT03, FT04
saltbush/es	*Atriplex* spp.	FT01, FT05, FT06
samphire@	*Arthrocnemum* sp.	FT18
satintop grass	*Bothriochloa erianthoides*	FT23
scented top	*Capillipedium parviflorum*	FT13
scrub leopardwood	*Flindersia dissosperma*	FT07, FT24, FT25, FT26

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sedges@	*Cyperus* spp.	FT08, FT18
serpentine bloodwood	*Corymbia xanthope*	FT27
serpentine ironbark	*Eucalyptus fibrosa* subsp. fibrosa	FT27
shot grass	*Paspalidium globoideum*	FT01, FT05, FT06, FT11, FT16, FT24
shrubby stylo*	*Stylosanthes scabra* cvv. Seca, Siran	FT02, FT03, FT04, FT06, FT08, FT09, FT10, FT14, FT15, FT16, FT19, FT20, FT22, FT24, FT25, FT26, FT28, FT30
sicklepod*	*Senna obtusifolia*	FT08
signal grass*	*Urochloa decumbens*	FT10
silky browntop	*Eulalia aurea*	FT01, FT02, FT05, FT08, FT11, FT14, FT19
silky oil grass	*Cymbopogon bombycinus*	FT14, FT31
silky umbrella grass	*Digitaria ammophila*	FT31
silver-leaved ironbark	*Eucalyptus melanophloia*	FT02, FT03, FT12, FT13, FT14, FT15, FT19, FT23, FT24, FT25, FT28
silvertop stringybark	*Eucalyptus laevopinea*	FT13
siratro*	*Macroptilium atropurpureum*	FT08, FT16
slender chloris	*Chloris divaricata*	FT02, FT04, FT13, FT27
small burr grass	*Tragus australianus*	FT02, FT04, FT12, FT13, FT14, FT15, FT17, FT20, FT21, FT22, FT24, FT25, FT26, FT28, FT30
smooth-barked apple gum	*Angophera leiocarpa*	FT12
soap bush	*Alphitonia excelsa*	FT17
soft spinifex	*Triodia pungens*	FT14, FT31
speargrass	*Aristida* spp.	FT29
spotted gum *see* lemon-scented gum	*Eucalyptus citriodora*	FT22, FT30
spring grass	*Eriochloa creba*	FT01, FT09, FT11
star grass *see* yabila grass		
summer grass/es	*Digitaria* spp.; *Urochloa* spp. (syn. *Brachiaria* spp.)	FT03, FT10, FT12, FT15, FT17, FT20, FT21, FT22, FT30

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swamp box	*Lophostemon suaveolens*	FT08, FT09
swamp mahogany *see* swamp box		
tableland couch	*Calyptochloa gracillima*	FT17, FT20, FT21
tall chloris	*Chloris ventricosa*	FT01, FT04, FT05, FT11, FT12, FT17, FT25
tall finger grass*	*Digitaria millianjiana* cvv. Strickland, Jarra, Arnhem	FT29
tree zamia	*Cycas media*	FT27
Tully grass *see* Koronivia		
turkey bush	*Erythroxylon australe*	FT17, FT20, FT21, FT24
turpentine	*Syncarpia glomulifera*	FT09
umbrella cane grass	*Leptochloa digitata*	FT01, FT05, FT11
umbrella grass	*Digitaria divaricatissima*	FT23
velvety tree pear*	*Opuntia tomentosa*	FT01, FT06
vine tree	*Ventilago viminalis*	FT25, FT28
wanderrie grass/es	*Eriachne* spp.	FT15, FT20, FT21, FT22, FT30, FT31
Warrego grass	*Paspalidium jubiflorum*	FT01, FT05, FT11, FT24
wattle/s	*Acacia* spp.	FT07, FT12, FT15, FT17, FT22, FT23, FT25, FT27, FT30
weedy sporobolous grasses*	*Sporobolous* spp.	FT10
weeping lovegrass	*Eragrostis parviflora*	FT01, FT05, FT11, FT23
white grass	*Sehima nervosum*	FT14, FT31
white mahogany	*Eucalyptus acmenoides*	FT09
white speargrass	*Aristida leptopoda*	FT07, FT19, FT23, FT27, FT28
wilga	*Geijera parviflora*	FT04, FT06, FT24, FT29
windmill grass/es	*Chloris truncata*	FT02, FT22, FT30
wiregrass	*Aristida echinata*	FT12

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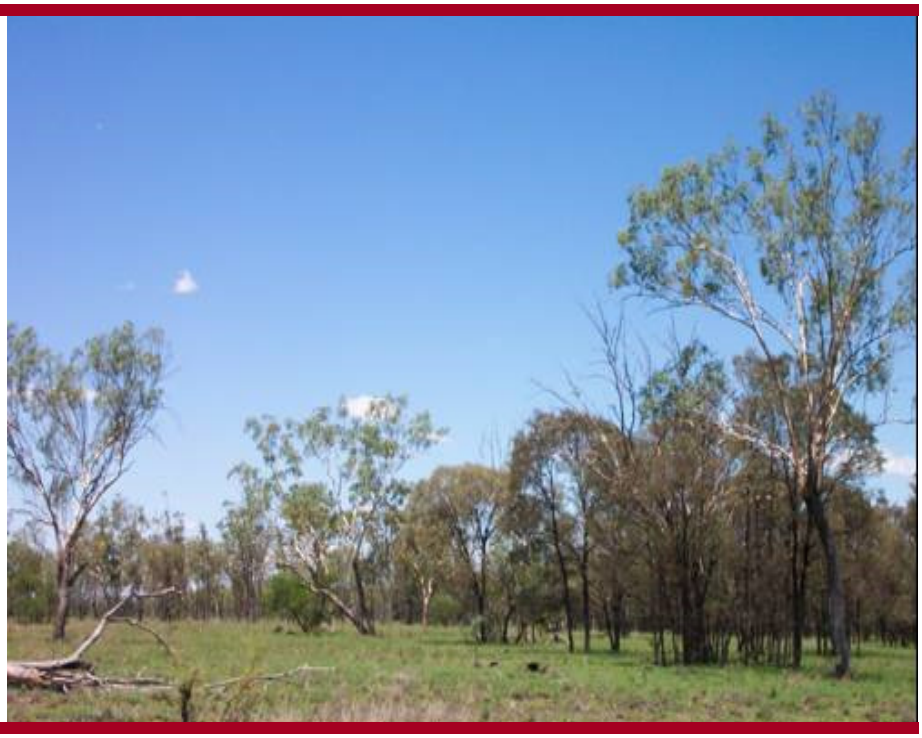
wiregrass/es	*Aristida* spp.	FT05, FT06, FT09, FT12, FT16, FT19, FT25, FT27, FT26, FT31
woodland lovegrass	*Eragrostis sororia*	FT24
yabila grass	*Panicum queenslandicum*	FT04, FT19, FT23
yapunyah	*Eucalyptus thozetiana*	FT04, FT16, FT17
yellow box	*Eucalyptus melliodora*	FT13
yellowjacket	*Eucalyptus similis, Corymbia Leichhardtii*	FT31
yellowwood	*Terminalia oblongata*	FT01, FT04, FT05, FT06
zamia	*Macrozamia* sp.	FT30

* Denotes non-native species
@ Denotes non-grass species that are important to grazing and land condition values in estuarine wetland land types.

Alluvial brigalow



Landform

Alluvial plains.

Woody vegetation

Brigalow scrub with occasional coolibah, bauhinia and yellowwood. Understorey of false sandalwood, currant bush and sally wattle.

Expected pasture composition

** Denotes non-native "Expected Pasture Composition" species.*

Preferred

Queensland bluegrass, forest bluegrass, silky browntop, bull and curly Mitchell grass.

Intermediate

Native millet, shot grass, Warrego grass, spring grass, curly windmill grass, tall chloris.

Non-preferred

Fairy grass, umbrella cane grass, weeping lovegrass.

Annual grasses

Button grass.

Common forbs

Saltbushes.

Suitable sown pastures

Bambatsi panic, buffel grass, Angleton grass, purple pigeon grass, Caatinga stylo, leucaena (>120 cm where not frequently or severely flooded), butterfly pea (>90 cm), Desmanthus.

Introduced weeds

Parthenium, parkinsonia, mother-of-millions, harrisia cactus, velvety tree pear.

Soil

A strongly self-mulching black (occasionally grey) cracking clay (black or grey vertosols and dermosols).

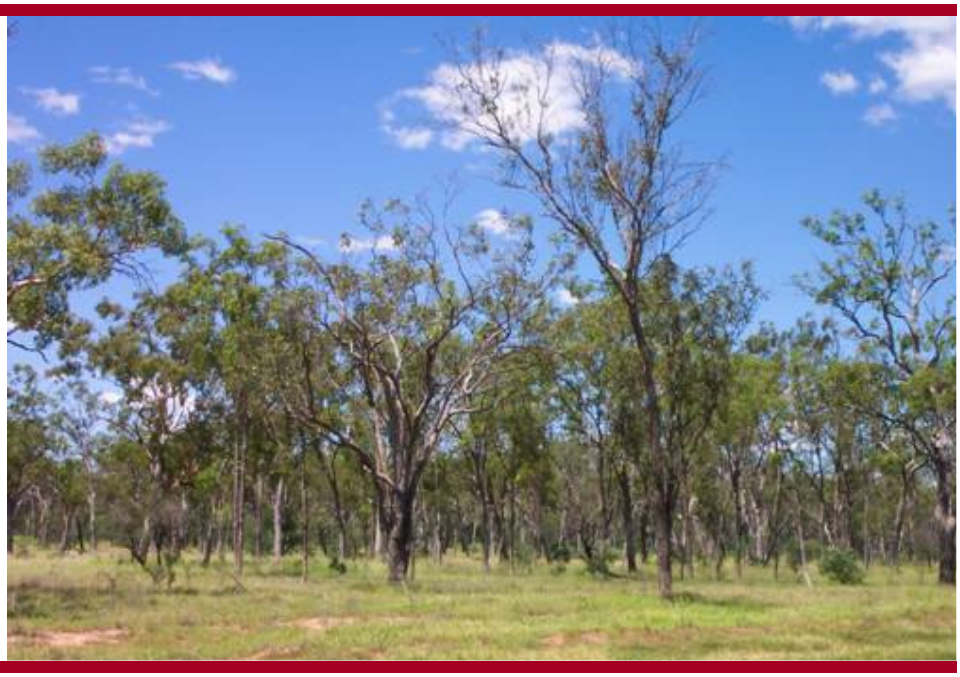
Description	***Surface*:** Strong and fine self-mulching; ***Surface texture***: light to medium clay; ***Subsoil texture*:** medium to heavy clay.
Water availability	High
Rooting depth	60 cm
Fertility	Moderate to high total nitrogen; moderate phosphorus.
Salinity	Moderate (below 0.6 m).
Sodicity	Sodic (below 0.6 m); however, this is variable.
pH	Alkaline
Utilisation	30%
Enterprise	Finishing
Land use and management recommendations	• Pasture establishment difficult due to coarse self-mulching surface. • Maintain good ground cover to discourage parthenium weed invasion. • When mixed with other less fertile land types in a paddock, alluvial areas are at risk of overgrazing. • Land condition should be monitored carefully and management adjusted if necessary to reduce grazing pressure in these areas.
Land use limitations	• Moderate to poor drainage. • Occasional flooding. • Salinity • Parthenium weed invasion. • Regrowth
Conservation features and related management	• Most brigalow remnants are very small in area, such as shade lines and stock shelter areas near water. These can be readily enhanced by allowing natural regeneration of regrowth around them and strategically along fencelines to re-establish landscape linkage especially to riparian areas. • The succulent weeds mother-of-millions, velvety tree pear and harrisia cactus can be a problem in virgin and regrowth brigalow, and can be controlled with selective use of fire, biological controls and herbicide sprays. Parthenium infestations can also be a problem.
Regional ecosystems	11.3.1.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967; Story *et al* 1967) Funnel 3, Blackwater 5, Comet 6, Cungellela 4, Somerby 6; AMU (DPI 1993) Rolleston; Soil associations (Shields *et al* 1993; Burgess 2003) Cattle, Solferino, Langley.

Blue gum / river red gum flats

Landform	Alluvial plains.
Woody vegetation	Blue gum / river red gum woodland with coolibah and poplar box, and occasional Moreton Bay ash and silver-leaved ironbark.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Forest bluegrass, Queensland bluegrass, desert bluegrass, black speargrass, kangaroo grass, hairy panic, silky browntop.
Intermediate	Curly windmill grass, early spring grass, giant speargrass, windmill grass.
Non-preferred	Dark wiregrass, coolibah grass, rat's tail grass, poverty grass, fairy grass, bottlewasher grasses, slender chloris, red Natal grass*, five-minute grass.
Annual grasses	Button grass, small burr grass, Flinders grass.
Common forbs	Matrush (intermediate).
Suitable sown pastures	Bambatsi panic, buffel grass, creeping bluegrass, Gatton panic, Rhodes grass, Angleton grass, Caatinga stylo, Desmanthus, butterfly pea, and leucaena on deeper well drained areas.
Introduced weeds	Parthenium, lantana, caster oil plant, parkinsonia, rubbervine.
Soil	Deep black cracking clays (vertosols).
Description	***Surface*:** Self-mulching, firm or crusting; ***Surface texture*:** light clay to medium clay; ***Subsoil texture*:** heavy clay.
Water availability	Moderate to high.
Rooting depth	Deep >1 m
Fertility	Moderate to high total nitrogen; moderate to high phosphorus.
Salinity	Moderate (below 0.9 m).
Sodicity	Sodic (below 0.9 m).

pH	Strongly alkaline.
Utilisation	30%
Enterprise	Finishing
Land use and management recommendations	• Suitable for pasture improvement. • Retain trees on bed and banks of streams. • Retain valuable timber trees. • Caribbean and shrubby stylos should only be planted on areas where the soil surface is sandy. • Disturbance encourages germination of woody plants. • When mixed with other less fertile land types in a paddock, alluvial areas are at risk of overgrazing. • Land condition should be monitored carefully and management adjusted if necessary to reduce grazing pressure in these areas.
Land use limitations	• Flooding and waterlogging on clay soils. • Restricted access in wet conditions. • Parthenium weed invasion on clay soils. • Erosive flooding in some areas. • Pasture establishment problems on cracking clays. • In coastal areas phosphorus levels are often lower for blue gum on cracking clay soils (serpentine derived).
Conservation features and related management	• Large, old gum trees often provide hollows for arboreal marsupials (e.g. greater gliders); nesting sites for raptors (e.g. boobook, barn owls, kites, goshawks), parrots, cockatoos and various other birds, (e.g. dollarbirds, kookaburras, owlet nightjars); food trees for koalas and greater gliders, and nectar sources for sugar gliders, nectareous birds, fruit bats and bees. • Seed eating birds (e.g. manikins, finches and doves) make use of the frontage grasses for food and shelter. • Riparian vegetation is an important corridor for migrating wildlife, and areas with steep sandy banks are critical for breeding of the 'bottom-breathing' freshwater turtles. • Watercourse ecology depends heavily on the presence of healthy fringing vegetation, snag provision, and good water quality. • Red gum forests require periodic flooding to exist (about once every 5–20 years). • Fencing off riparian area, with parts of the adjacent floodplain, can prevent overgrazing of young gum seedlings and assist regeneration of the woodlands. • Placing watering points away from the stream will reduce trampling damage, erosion and weed invasion on the riverbanks. • Low disturbance and low usage of fire in these areas is recommended as weed infestations readily establish in flood events.
Regional ecosystems	8.3.6c, 8.3.13c, 8.3.14, 11.3.4, 11.3.25, 11.3.25a-g, 11.3.26, 11.3.27, 11.3.27a-g, 11.3.27x1a-b, 11.3.37, 11.3.38, 11.3.38a, 11.5.17, 12.3.7c.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967) Mantuan 3, Bogantungan 3; Soil associations (Burgess 2003) German, Thirteenmile.

Box flats



Landform

Alluvial plains.

Woody vegetation

Poplar box woodland with Moreton Bay ash, occasional silver-leaved ironbark, bauhinia, bloodwood and Queensland blue gum. Often an understorey of sally wattle.

Expected pasture composition

** Denotes non-native "Expected Pasture Composition" species.*

Preferred	Black speargrass, cotton panic, forest bluegrass, kangaroo grass.
Intermediate	Curly windmill grass, summer grass.
Non-preferred	Feathertop wiregrass, erect kerosene grass.
Annual grasses	Comet grass.
Common forbs	Flannel weeds (non-preferred).

Suitable sown pastures

Buffel grass, creeping bluegrass, digit grass, butterfly pea (>90 cm), shrubby stylo, Caribbean stylo, Caatinga stylo.

Introduced weeds

Parkinsonia, mother-of-millions, harrisia cactus.

Soil

Sandy surfaced brown (occasionally grey) texture contrast soil (sodosol).

Description	***Surface*****:** Firm to hard-setting; ***Surface texture*****:** sandy, silty or loamy; ***Subsoil texture***: medium clay to heavy clay.
Water availability	Low to moderate.

Rooting depth	0.6 to 0.9 m.
Fertility	Low total nitrogen; low to moderate phosphorus.
Salinity	Non-saline
Sodicity	High (below 0.30–0.6 m).
pH	Alkaline
Utilisation	25%
Enterprise	Growing and finishing.
Land use and management recommendations	• Exposed sodic B horizon on roads and dams will erode. • Goes to bulldust when disturbed. • Will deteriorate to clay pans with heavy grazing. • When mixed with other less fertile land types in a paddock, alluvial areas are at risk of overgrazing. • Land condition should be monitored carefully and management adjusted if necessary to reduce grazing pressure in these areas.
Land use limitations	• Dispersive subsoil.
Conservation features and related management	• When these areas are in good condition they provide habitat for a wide range of macropods (sometimes up to eight species can be seen), arboreal marsupials, birds and reptiles. A prolific number of reptiles can be found if there is a good litter cover. • In a healthy state these woodlands have good nutrient cycling via litter decomposition and soil microbial activity keeping the soil, pasture and trees healthy and productive. • Ideally these flats should be spelled in the wet summer months to allow native pastures to re-seed. • As these areas are the 'cream' for both wildlife and grazing production a balance should be sought, a recommended 100 m buffer along creeks and rivers fenced and more lightly grazed.
Regional ecosystems	11.3.2, 11.3.2a-b, 11.3.7.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967; Story et al 1967) Alpha 2, Funnel 2, Connors 2; Soil associations (Burgess 2003; Shields *et al* 1993) Booroondarra, Parrot, Roper, Stephens Fletcher.

Brigalow with blackbutt (Dawson gum)

Landform	Undulating plains, lowlands, downs, low tablelands and hills.
Woody vegetation	Brigalow scrub with emergent blackbutt or yapunyah. Solid patches of blackbutt or yapunyah tend to occur in this land type where there is a high soil salt load. Understorey commonly of false sandalwood, yellowwood or wilga; occasionally leopardwood, sally wattle or currant bush.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Queensland bluegrass, desert bluegrass, forest bluegrass, black speargrass, bull Mitchell grass, kangaroo grass.
Intermediate	Native millet, curly windmill grass, brigalow grass, pitted bluegrass, tall chloris, yabila/star grass, barbwire grass.
Non-preferred	Dark wiregrass, fairy grass, slender chloris, bottlewasher grasses, purple lovegrass.
Annual grasses	Flinders grass, small burr grass.
Suitable sown pastures	Buffel grass, Gatton panic, creeping bluegrass, butterfly pea (>90 cm), shrubby stylo, Caatinga stylo, Caribbean stylo.
Introduced weeds	Parthenium.
Soil	A hard-setting, red to brown, texture contrast soil with a sodic B horizon (brown sodosol).
Description	***Surface*:** Hard-setting; ***Surface texture*:** sandy clay loam; ***Subsoil texture*:** light to medium clay.

Water availability	Low to moderate.
Rooting depth	60 cm
Fertility	Low to moderate total nitrogen; moderate phosphorus.
Salinity	Moderate to high (below 60 cm).
Sodicity	Strongly sodic (below 40 cm).
pH	Strongly alkaline.
Utilisation	30%
Enterprise	Finishing

Land use and management recommendations

- Suitable for sown pastures as the light surface texture responds to small and infrequent rainfall.
- Maintain surface cover to reduce sheet erosion, nutrient loss and pasture rundown.
- Erosion of roads and dams where subsoil left exposed.

Land use limitations

- Sodic subsoil.
- Poorly drained.
- Hard-setting surface.
- Regrowth problems.

Conservation features and related management

- The key features of this habitat include a highly diverse reptile community that uses fallen timber, dead trees and exfoliating bark, particularly gecko species (*Gehyra* spp. and *Oedura* spp.), dragons (*Agamidae* spp.) and skinks (*Egernia striolata, Morethia boulengeri*).
- A number of woodland bird species declining in south-eastern woodlands such as the bush stone-curlew, squatter pigeon, brown treecreeper and grey-crowned babbler live in these woodlands.
- Retain all fallen timber and dead trees in the land type as these provide valuable habitat for birds and reptiles. Also the gradual decomposition of this timber is important in the nutrient cycling of the ecosystem.
- It is important to maintain ground cover in the form of litter and pasture where possible as the soil B horizon is very sodic, dispersive, erosive and hard to re-pasture.

Regional ecosystems

11.4.7, 11.4.8, 11.9.1, 11.11.16, 11.11.19.

Land units; Agricultural management unit; Soil associations

Land units (Gunn *et al* 1967; Story *et al* 1967; Speck *et al* 1968; Gillespie 1991) Disney 3, Humboldt 3 & 6, Skye 4, Pinehill 3, Wharton 4, Thornby 3, Aldis; Agricultural Management Units (Thwaites and Maher 1993) Turkey Creek, College, Glengallan; Soil associations (Burgess 2003; Shields *et al* 1993) Stateschool, Racetrack, Racetrack shallow phase, Hazelbrae, Honeycomb, Winvic.

Brigalow with melonholes

Landform	Undulating plains, lowlands, downs, low tablelands and hills.
Woody vegetation	Brigalow scrub with understorey of false sandalwood, currant bush, and occasionally yellowwood.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Queensland bluegrass, forest bluegrass, desert bluegrass, silky browntop, bull and curly Mitchell grass.
Intermediate	Native millet, shot grass, Warrego grass, tall chloris.
Non-preferred	Fairy grass, umbrella cane grass, wiregrass.
Annual grasses	Button grass, weeping lovegrass.
Common forbs	Saltbushes.
Suitable sown pastures	Buffel grass, Bambatsi panic, purple pigeon grass, Angleton grass, leucaena (>120 cm), butterfly pea (>90 cm), Desmanthus, Caatinga stylo, Caribbean stylo.
Introduced weeds	Parthenium, mother-of-millions.
Soil	Gilgaied, brown or grey cracking clay (brown or grey vertosol).
Description	***Surface*:** Surface mulching to hard-setting (variable between mounds and depressions); ***Surface texture*:** medium to heavy clay; ***Subsoil texture*:** medium to heavy clay.

Water availability	Low to moderate.
Rooting depth	Shallow
Fertility	Low to moderate total nitrogen; low to moderate phosphorus.
Salinity	High (below 30 cm).
Sodicity	Strongly sodic (below 30 cm).
pH	Strongly alkaline.

Utilisation

30%

Enterprise

Finishing

Land use and management recommendations

- Not suited to cultivation.
- Tunnelling problems through dam walls.

Land use limitations

- Melonholes
- Regrowth

Conservation features and related management

- As there are very few areas of this land type remaining in the Fitzroy Basin they are of high value. It is an ecosystem where the higher drier parts of the melonholes are heavily grazed, and depressions, which become water-logged in the wet provide for a unique and very specific suite of plants.
- In its natural state this land type offers limited grazing value but a high ecological value.
- An endangered plant *Solanum adonaphyrum* is associated with these melonholes, as is the poorly recorded plant *S. elacaphyllum.*
- Brigalow melonholes can be prolific breeding sites for frogs, and are an attractant for species such as the vulnerable ornamental snake (*Denisonia maculata*) that feeds almost exclusively on frogs.
- These areas are very readily degraded because of their uneven wetness and plant composition.
- The ideal scenario for conservation would be to fence these unique areas off from grazing.

Regional ecosystems

11.4.3, 11.4.3a, 11.4.9, 11.4.9a-b.

Land units; Agricultural management unit; Soil associations

Land units (Gunn *et al* 1967; Story *et al* 1967) Islay 4, Somerby 5, Humboldt 5; Agricultural Management Units (Thwaites and Maher 1993) Lonesome; Soil associations (Burgess 2003; Shields *et al* 1993) Turon, Warwick, Pomegranate melonhole phase, Norwich, Knockane, Picardy surface seal phase, Nungaroo, Midden.

Brigalow softwood scrub

Landform

Undulating scrub plains.

Woody vegetation

Brigalow and belah scrub with wilga (decreasing frequency towards the north) or yellowwood (increasing frequency towards the north); and occasional bottletree, bonewood, Crow's ash, ooline, bauhinia, myall and poplar box. An understorey of currant bush, false sandalwood and limebush.

Expected pasture composition

** Denotes non-native "Expected Pasture Composition" species.*

Preferred

Desert bluegrass, forest bluegrass, Queensland bluegrass, curly and bull Mitchell grass, kangaroo grass.

Intermediate

Brigalow grass, shot grass, curly windmill grass.

Non-preferred

Fairy grass, wiregrasses.

Common forbs

Saltbushes (intermediate). Roly poly burr, galvanised burr (non-preferred).

Suitable sown pastures

Buffel grass, Gatton panic, Green panic, creeping bluegrass, Desmanthus, butterfly pea, Caatinga stylo, shrubby stylo, Caribbean stylo.

Introduced weeds

Parthenium, velvety tree pear.

Soil

Dark brown and grey-brown cracking clay soils (vertosol) or deep, dark brown gradational or uniform soils (dermosols).

Description

***Surface*:** Strong and fine self-mulching; ***Surface texture*:** light to medium clay; ***Subsoil texture*:** medium to heavy clay.

Water availability	Moderate to high.
Rooting depth	Deep (below 90 cm).
Fertility	Moderate total nitrogen; moderate phosphorus.
Salinity	Moderate (below 40–90 cm, depending on location).
Sodicity	Low (below 60 cm).
pH	Neutral to alkaline.
Utilisation	30%
Enterprise	Finishing
Land use and management recommendations	• Suitable for cropping on soils deeper than 45 cm and on slopes less than 4%. • Suitable for pasture improvement.
Land use limitations	• Regrowth • Salinity can affect rooting depth. • Moderate erosion hazard when cultivated. • Surface sealing soils. • Waterlogging.
Conservation features and related management	• This land type is very rare in the Fitzroy landscape and the remaining patches of scrub are critical to migratory birds such as yellow robins, grey fantails, varied trillers and rufous fantails. • These scrubs are important habitat for bush turkeys and black-striped wallabies in the dry interior. • Softwood scrubs have a wide range of plant species at their inland limits of distribution. • This land type is very susceptible to fire and therefore a firebreak around its periphery is warranted, especially if adjoining a dense stand of buffel grass. Burning around the scrub margins should only be undertaken when fuels are not completely cured or at the coolest time of the year. Burning should be conducted from the scrub margins out into surrounding vegetation, to reduce fire intensity at the scrub interface. • Velvety tree pear can be a problem in this land type. • Seasonal light grazing of these areas is recommended to knock down the buffel grass but keep the native forbs and shrubs.
Regional ecosystems	11.3.1b, 11.5.16, 11.9.5, 11.9.5a, 11.5.15, 11.11.13, 11.11.14, 11.12.21.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967; Story *et al* 1967) Kareela 3 & 4, Cungelella 2 & 3; Agricultural Management Units (Thwaites and Maher 1993) Picardy; Soil associations (Burgess 2003; Shields *et al* 1993) Turon, Warwick, Norwich, Knockane, Picardy

Bulloak country

Landform	Hill and ranges, alluvial valleys.
Woody vegetation	Bulloak as a monoculture or with emergent poplar box, Clarkson's bloodwood and occasional false sandalwood, Leichhardt bean, scrub leopardwood, quinine tree, ironwood, wattles.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass.
Intermediate	Golden beard grass.
Non-preferred	Lovegrasses, white speargrass, five-minute grass.
Annual grasses	
Suitable sown pastures	Not suitable for development.
Introduced weeds	
Soil	Brown or grey, hard-setting, sandy surfaced, texture contrast soil (sodosol)
Description	***Surface:*** Hard-setting; ***Surface texture:*** sandy; ***Subsoil texture:*** sandy medium clay.
Water availability	Low

Rooting depth	15–30 cm.
Fertility	Very low total nitrogen; very low phosphorus.
Salinity	Moderate below 60 cm.
Sodicity	Strongly sodic below 60 cm.
pH	Acid to strongly acid.

Utilisation

15%

Enterprise

Breeding

Land use and management recommendations

- Extensive grazing; questionable grazing value.
- Not suitable for development.

Land use limitations

- Soils are very unstable and prone to extreme erosion and degradation following disturbance.

Conservation features and related management

- This land type is not fauna rich; however, bull oak provides roosting and nesting sites for a range of small passerine (perch) birds (e.g. finches, wrens, honeyeaters), and those species with more specialised requirements such as the spotted nightjar which roosts on the ground in thicker vegetation. Arboreal geckoes can also be found.
- It is important to avoid these areas as much as possible for infrastructure such as roads and fence-lines as the sodic subsoil is very dispersive and extremely erosive.
- Ideally these areas should be fenced out as they have no grazing value and their high tree density would be a mustering problem.

Regional ecosystems

8.12.31b, 11.5.1a, 11.5.2a, 12.11.21.

Land units; Agricultural management unit; Soil associations

Land units (Gunn *et al* 1967; Story *et al* 1967) Monteagle 4; Agricultural Management Units (Thwaites and Maher 1993) Picardy; Soil associations (Burgess 2003) Heyford and Bundoora.

Coastal flats with mixed eucalypts on grey clay

Landform	Alluvial plains with variable terraces, levees, swamps and channels.
Woody vegetation	Swamp box, poplar gum, pink bloodwood and blue gum woodlands with broad-leaved tea tree understorey.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Native sorghum, forest bluegrass, early spring grass, silky browntop, black speargrass, giant speargrass, kangaroo grass.
Intermediate	Pitted bluegrass, golden beard grass, large bluegrass.
Non-preferred	Blady grass, purpletop chloris*, couch grass, reedgrass, crowsfoot grass, lovegrass, five-minute grass.
Annual grasses	
Common forbs	Sedges.
Suitable sown pastures	Rhodes grass, creeping bluegrass, pangola grass, Gatton panic, Green panic, shrubby stylo, Caribbean stylo, Caatinga stylo, Desmanthus, siratro on better soils, and para grass grows on swampy plains.
Introduced weeds	Giant rat's tail grass, sicklepod.
Soil	Bleached silty loam (dermosols and kandosols) but including clays, earths and poorly developed alluvial soils.
Description	***Surface:*** Hard-setting; ***Surface texture:*** silty loam; ***Subsoil texture:*** light to medium clay.

Water availability	Low
Rooting depth	0.5 m
Fertility	Low total nitrogen; low phosphorus.
Salinity	Low to moderate.
Sodicity	Low
pH	Neutral to acid.
Utilisation	20%
Enterprise	Breeding; fattening where soils deeper and with high fertiliser application.
Land use and management recommendations	• Many areas can be developed to sown pastures with high inputs.
Land use limitations	• Underlain by hardpans and susceptible to summer waterlogging (poorly drained). • Surface turns to bulldust. • Regrowth when cleared.
Conservation features and related management	• Mature coastal woodlands with hollow habitat trees. These areas support sugar gliders, brush tailed possums, hollow breeding bird species (e.g. treecreepers) and micro bats (e.g. Gould's long-eared bat, *Nyctophilus gouldi*). • Microbats and small woodland birds have a vital role in maintaining the balance of insects and other invertebrates in the system while the larger fruit bats and some birds serve as pollinators of the eucalypts and bloodwoods. • Nectar resources from the melaleucas are very important seasonally for nomadic honeyeaters from all across eastern Australia. • Uncommon bird species in coastal mixed eucalyptus woodland include grey goshawk, square-tailed kite, and glossy black-cockatoo. • Retention of litter and dead timber on the ground is important for the little known blind snakes and collared delma (legless lizard). • Seasonal small wetlands, sometimes with a fringe of paperbark tea tree (*Melaleuca* spp.), are important breeding areas for frogs and aquatic invertebrates. Avoid stock concentrations around these areas. • With relatively low fertility and physically difficult soils coastal woodland areas need careful management to minimise erosion and avoid abundant growth of *Acacia* spp.(wattle) and other shrub species. • Overgrazing, machine clearing or poor placement of tracks can trigger degradation. • Pasture decline and erosion associated with salinity can occur on foot slopes of hills following clearing. Over-clearing can lead to regrowth problems with the melaleuca species. • Locking up to allow pasture to bulk up and burning at 3–7 year intervals can be the most effective tool to maintain healthy ground cover.
Regional ecosystems	8.11.3c, 11.3.29, 11.3.29a, 11.3.35, 11.5.8a-c, 11.11.20.
Land resource area	Alluvial plain – mixed eucalypts on bleached massive earths (Forster in prep).

Coastal sand dunes

Landform	Coastal sand dunes.
Woody vegetation	Pink bloodwood, white mahogany, Moreton Bay ash, turpentine, paperbark tea tree, swamp box woodland with a grass tree, grevillea, coast banksia understorey.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Kangaroo grass, giant speargrass.
Intermediate	Spring grass.
Non-preferred	Wiregrass, lovegrass.
Annual grasses	Fire grass.
Suitable sown pastures	Creeping bluegrass, Indian bluegrass, digit grass, roundleaf cassia, Caribbean stylo, shrubby stylo; limited options for pangola and Rhodes grasses.
Introduced weeds	Molasses grass, lantana, bellyache bush.
Soil	Deep yellow, red and brown sands (tenosols).
Description	***Surface texture*:** Loose sand, often bleached; ***Surface texture*:** sand; ***Subsoil texture:*** sand.
Water availability	Very low.
Rooting depth	Deep (>1 m)
Fertility	Very low total nitrogen; very low phosphorus.
Salinity	Low

Sodicity	Non-sodic
pH	Neutral to acid.
Utilisation	20%
Enterprise	Breeding
Land use and management recommendations	• Limited clearing options, fire or chemical treatment of woody regrowth, less use of fire where there is sown pastures.
Land use limitations	• Low nutritional quality of native pastures. • High input costs for sown pastures.
Conservation features and related management	• Important water recharge areas. • Coastal dunes can have low swales with paperbark tea tree (*Melaleuca* spp.) and vine scrubs (beach rainforest). These scrubs are a valuable for migratory fruit pigeons. Seasonal flowering tea tree areas are important areas for flying fox, lorikeets, and many honeyeater species. • Breeding of egrets, spoonbills, ibis and other waterbirds may occur during periods when the tree lined dune swales are inundated by freshwater floods. • The closed vine scrubs on dunes are important for many species of butterfly and act as migratory stop-over points for nomadic birds up and down the coast such as rose-crowned fruit dove, top knot pigeons, channel-billed cuckoos and koels. • Sand dunes are very good habitat for 'digging' fauna, such as burrowing frogs, sand goannas and sand-swimming skinks. • Weeds (such as molasses grass, red Natal grass, lantana and bellyache bush) can be a problem around their periphery. Surrounding areas of dense guinea grass should be grazed in order to minimise damage from wildfires to these scrubs. • Coastal sand dune systems are very susceptible to damage from grazing. Use fencing or low stocking rates to avoid disturbance to the frontal dunes that are most susceptible to wind and wave erosion. Protected dunes further inland can provide seasonal grazing on the blady grass dominated pasture, although annual burning of blady grass should be avoided. • Overstocking can cause damage through tunnelling and enhance wind and weed incursion into the scrubs.
Regional ecosystems	8.2.1, 8.2.2, 8.2.3a, 8.2.3d, 8.2.4x2a-c, 8.2.6a-b, 8.2.7b-c, 8.2.7e, 8.2.8a-b, 8.2.8d-e, 8.2.10, 8.2.11, 8.2.12b, 8.2.13a, 11.2.1, 11.2.2, 11.2.2a-b, 11.2.3, 11.2.4, 11.2.5, 11.2.5a-b, 12.2.4, 12.2.6, 12.2.8, 12.2.9, 12.3.13, 12.3.14, 12.3.14a, 12.5.10, 12.5.9, 12.5.9a, 12.9-10.22, 12.2.11, 12.2.12, 12.2.13, 12.2.14, 12.2.14a-c, 12.2.14e-i, 12.2.15, 12.2.16, 12.12.19.
Land resource area	Sand plains – eucalypts and coastal scrub on sands (Forster, in prep).

Coastal tea tree plains

Landform	Broad coastal plains.
Woody vegetation	Broad-leaved and narrow-leaved tea tree, pink bloodwood and bulloak with emergent narrow-leaved ironbark, Queensland peppermint, poplar gum, ghost gum, grass tree and cabbage palm.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Golden beard grass, black speargrass, giant speargrass, native legumes (*Alysicarpus* and *Desmodium* species).
Intermediate	
Non-preferred	Poverty grass, blady grass.
Annual grasses	Summer grasses
Suitable sown pastures	Pangola grass, Koronivia, jointvetch on low-lying areas with poor drainage; signal grass, creeping bluegrass, Rhodes grass, Caribbean and shrubby stylos and roundleaf cassia on better drained areas.
Introduced weeds	Weedy sporobolous grasses.
Soil	Either bleached coarse sands or silty surfaced grey and brown sodic duplex soils with debil-debil mounds (tenosols or sodosols).
Description	***Surface:*** Hard-setting; ***Surface texture*****:** coarse sand or silty loam; ***Subsoil texture*****:** coarse sand or mottled medium clay.
Water availability	Low to very low.
Rooting depth	0.6 m
Fertility	Very low total nitrogen; very low phosphorus.

Salinity	Low
Sodicity	Only texture contrast soil, moderate (0.6–0.9 m).
pH	Acid
Utilisation	15%
Enterprise	Breeding, occasional growing and fattening using high input sown pastures.
Land use and management recommendations	• Use fire to control seedlings and woody regrowth. Tea tree regrowth following clearing may require deep disk ploughing (15–20 cm), blade ploughing or Grasslan treatment. • Use fire less frequently in sown pasture systems. • Retain trees on bed and banks of streams and larger (shade and shelter) areas of tree vegetation as clumps or strips.
Land use limitations	• Woody regrowth problems. • Erosive. • Access problems due to summer waterlogging. • Low nutritional value of native pastures; high input costs for sown pastures.
Conservation features and related management	• From autumn through to spring the coastal tea tree areas experience cycles of flowering that attract noisy flocks of lorikeets and various honeyeaters. A great variety of smaller heath plants, also flower from winter into spring. • At risk plants of the coastal tea tree plains include the orchid *Habenaria xanthantha* and the Byfield vanilla lily (*Sowerbaea subtilis*). • These plains are important habitat for migratory coastal woodland birds such as kingfishers, whistlers and some robins. They are important habitat for north-south and upland/lowland movement by migratory/nomadic bird species and important seasonal habitat for frogs. • Low nutrient status and poor physical characteristics of these coastal plain soils require care in management. • The sparse grass and sedge layer can suffer from dense suckering of trees and compaction where there is disturbance from overgrazing or clearing with the use of machinery and inappropriate herbicide. • Regular burning (3 to 5 years) with moderate but not hot fires is a better means of keeping this low coastal woodland open and fostering retention of the fire adapted native plant species which support both stock and native fauna. • This land type is favoured by feral pigs and they can cause severe disturbance, therefore feral pig controls should be implemented if evidence of their presence is detected.
Regional ecosystems	8.2.13a-b, 8.3.3b, 9.5.15, 11.3.12, 11.3.12a, 11.3.9, 11.3.9a, 11.5.8.
Land resource area	Tea tree plains; tea tree on coarse sands – granite fans and plains, tea tree on silty surfaced sodic duplex soils – fans and plains (Forster in prep).

Coolibah floodplains

Landform	Alluvial plains.
Woody vegetation	Coolibah woodland with an understorey of scattered clumps of brigalow and bauhinia.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Queensland bluegrass, forest bluegrass, silky browntop, bull and curly Mitchell grass, couch grass.
Intermediate	Native millet, shot grass, Warrego grass, spring grass, curly windmill grass, golden beard grass, tall chloris.
Non-preferred	Umbrella cane grass, weeping lovegrass, fairy grass.
Annual grasses	Button grass, Flinders grass, pepper grass.
Suitable sown pastures	Bambatsi panic, Angleton grass, buffel grass, purple pigeon grass, Caatinga stylo, butterfly pea, Desmanthus. Leucaena where not frequently or severely flooded.
Introduced weeds	Parthenium, parkinsonian, rubbervine, mimosa.
Soil	Black cracking clay (vertosol).
Description	***Surface*:** Firm to crusting; ***Surface texture*:** light clay to medium clay; ***Subsoil texture*:** medium to heavy clay.
Water availability	Moderate to high.
Rooting depth	60 cm
Fertility	Moderate total nitrogen; moderate phosphorus.
Salinity	Moderate (below 60 cm).
Sodicity	Sodic (below 0.6 m); however this is variable.
pH	Strongly alkaline.

Utilisation

30%

Enterprise

Growing and finishing.

Land use and management recommendations

- Suitable for pasture improvement.
- Suitable for cropping in areas not subject to severe flooding.
- Retain trees on bed and banks of streams.
- Soil disturbance encourages germination of woody species.
- When mixed with other less fertile land types in a paddock, alluvial areas are at risk of overgrazing.
- Land condition should be monitored carefully and management adjusted if necessary to reduce grazing pressure in these areas.

Land use limitations

- Flooding and waterlogging.
- Salinity and surface cracking.
- Restricted access in wet conditions.
- Weed invasion (parthenium).
- Erosive flooding in some areas.
- Establishment problems with improved pastures due to crusting / cracking or coarse self-mulching surface.

Conservation features and related management

- Older trees with hollows are important habitat for arboreal marsupials and provide nest sites for cockatoos and parrots. The branches provide roosting sites for waterbirds such as cormorants, ibis, spoonbills and egrets.
- Coolibah is one of the most important koala food trees.
- Other animals such as freshwater turtles, frogs, pygmy geese, whistling ducks and seasonal wetland plants such as water chestnuts and water lilies are common in this land type.
- Localised stands of lignum provide good habitat and shelter for breeding ducks, and larger burrowing frogs.
- Coolibah protects creeks and riverbanks from erosion.
- Coolibah regeneration is stimulated by flooding.
- Seedlings can be damaged by overgrazing, resulting in some areas where only mature trees can be seen.
- Overgrazing and soil disturbance can lead to parthenium and parkinsonia infestations. Retention of large tussock grasses, such as kangaroo grass, bluegrasses, coolibah grass and forest Mitchell grass, can provide a good body of pasture over dry seasons that will help control weed infestations.
- Fencing this riparian land type can make for better control of grazing pressures.

Regional ecosystems

11.3.3, 11.3.3a, 11.3.3c.

Land units; Agricultural management unit; Soil associations

Land units (Gunn *et al* 1967; Story *et al* 1967) Funnel 4, Comet 1, 4 & 5; AMU (DPI 1993) Moramana; Soil associations (Shields *et al* 1993; Burgess 2003) Lindsay, Bluchers, Issac, Moramana, Jeffray.

Cypress pine country

Landform

Undulating to low hills.

Woody vegetation

Cypress pine scrub with occasional silver-leaved ironbark, narrow-leaved ironbark, smooth-barked apple gum and Clarkson's bloodwood. An understorey of myrtle, dysentery bush and wattles.

Expected pasture composition

** Denotes non-native "Expected Pasture Composition" species.*

Preferred

Black speargrass, cotton panic, hairy panic.

Intermediate

Golden beard grass, pitted bluegrass, tall chloris, barbwire grass.

Non-preferred

Wiregrass (e.g. many-headed, Jericho), bottlewasher grasses, summer grass, poverty grass, lovegrasses.

Annual grasses

Button grass, small burr grass, comet grass.

Common forbs

Pimelea (non-preferred).

Suitable sown pastures

Not suitable for development.

Introduced weeds

Soil

Coarse sand (tenosol).

Description

Surface: Firm to hard-setting with rock outcrops; ***Surface texture***: sand to sandy loam; ***Subsoil texture:*** sand to sandy loam.

Water availability

Low to very low.

Rooting depth	Deep
Fertility	Low total nitrogen; low phosphorus.
Salinity	Low
Sodicity	Non-sodic
pH	Neutral
Utilisation	20%
Enterprise	Breeding
Land use and management recommendations	• The commercial timber species are useful for construction purposes.
Land use limitations	• Low fertility. • Not suited to clearing or cultivation. • Low soil moisture storage.
Conservation features and related management	• Extensive areas of cypress pine forests occur on state forest and timber reserves and are uniquely known for their high number of endangered, vulnerable and rare species including death adders, golden-tailed geckoes and yellow-tufted honeyeaters. • Where there is an understorey or a high density of saplings, cypress pine provides day time refuge areas for black-striped wallabies and nightjars, and habitat for birds which feed on or near the ground (e.g. spotted quail thrush, various thornbills, squatter pigeons, bronze wing pigeons, and grey thrush). • Cypress pine forests are generally managed for low frequency, low intensity fire regimes which in turn promote a dense fine and coarse litter layer and often multiple vegetation heights. • These forests support a rich reptile fauna that use important litter and peeling bark of old senescent trees habitat. The multi layered forests also provide habitat for a range of woodland bird species including honeyeaters, hooded robins, yellow robins and grey-crowned babblers. • Sandy cypress ecosystems are important recharge areas for stream and groundwater. • This land type is very susceptible to fire damage and therefore a firebreak around its periphery is warranted, especially if adjoining a dense stand of buffel grass. • Conservation objectives should aim to manage fire in these areas, particularly for retention of fallen litter 'fuel' loads that are important for reptile species.
Regional ecosystems	11.3.18, 11.3.19, 11.5.4, 11.5.5a, 11.10.11, 11.10.9, 11.8.9, 11.12.6b.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967) Playfair 3, Lennox 1 & 2; AMU (DPI 1993) Duckponds.

Eucalypts and bloodwood on clay

Landform	Undulating with areas of low hills and plateau remnants.
Woody vegetation	Grassy or open woodland of silver-leaved ironbark, red bloodwood, ghost gum and Moreton Bay ash with scattered Leichhardt bean and currant bush in understorey.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Forest bluegrass, desert bluegrass, Queensland bluegrass, black speargrass, paspalum, kangaroo grass, scentedtop.
Intermediate	Barbwire grass, native millet, slender chloris, hairy panic.
Non-preferred	Dark wiregrass.
Annual grasses	Small burr grass, button grass.
Common forbs	Balloon cottonbush (non-preferred).
Suitable sown pastures	Buffel grass, Angleton grass, creeping bluegrass, Caribbean stylo, Caatinga stylo, Desmanthus.
Introduced weeds	Parthenium.
Soil	Black or brown clay (dermosol or vertosol).
Description	***Surface:*** Hard-setting to self-mulching; ***Surface texture:*** sandy light clay to sandy medium clay; ***Subsoil texture:*** medium to heavy clay.

Water availability	Low
Rooting depth	0.8 m
Fertility	Moderate total nitrogen; low to moderate phosphorus.
Salinity	Low
Sodicity	Low
pH	Neutral to alkaline.

Utilisation

25%

Enterprise

Growing and finishing.

Land use and management recommendations

Land use limitations

- Surface often rocky.
- Steep slopes.

Conservation features and related management

- These open woodland communities provide important habitat especially for arboreal hollow dwellers.
- Woodlands are subject to periodic canopy dieback due to drought in parts of central Queensland.
- Grassy woodlands are subject to invasion by weeds (e.g. parthenium) particularly when ground cover becomes too low.

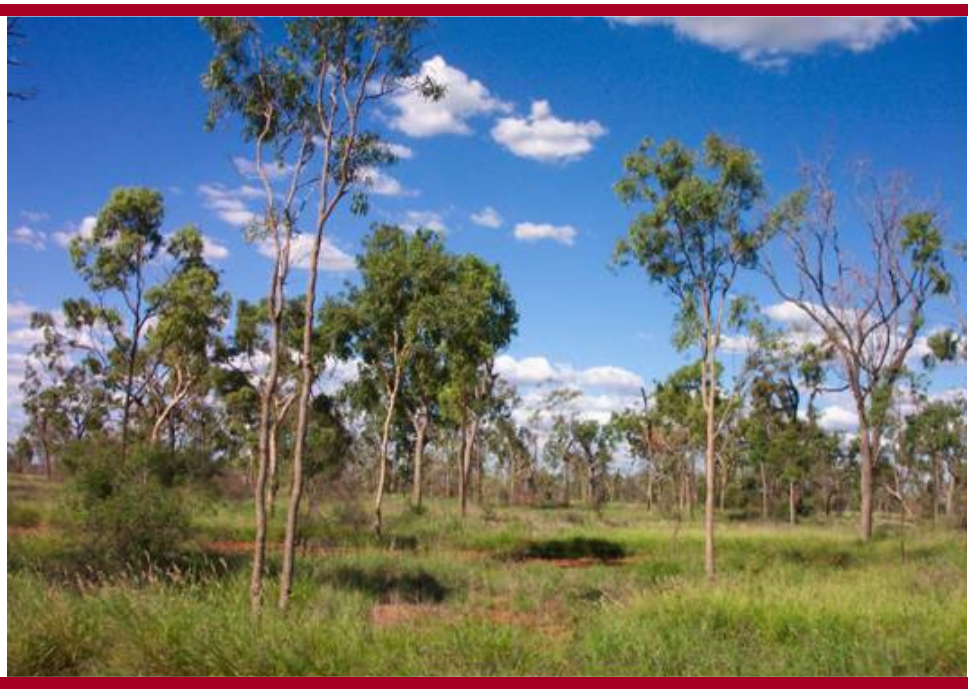
Regional ecosystems

11.4.2, 11.8.12, 11.11.10.

Land units; Agricultural management unit; Soil associations

Land units (Gunn *et al* 1967; Story *et al* 1967) Mantuan 1, Oxford 1, Skeleton 2, 3 & 4, Girrah 1, Nebo 1; Soil associations (Burgess 2003) Kirkcaldy, Carlo, Mt Stuart, May shallow phase, Middlemount, Windeyers Hill.

Eucalypts and bloodwood on loamy red tableland



Landform	Mountains and ranges.
Woody vegetation	Woodland of silver-leaved ironbark, narrow-leaved ironbark, bloodwood, desert oak, ghost gum with an understorey of rough-barked apple and prickly pine.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Desert bluegrass, black speargrass, cotton panic, kangaroo grass, hairy panic, finger panic (umbrella) grass, silky browntop, soft spinifex.
Intermediate	Golden beard grass, curly windmill grass, pitted bluegrass, white grass, *Austrochloris dichanthioides*.
Non-preferred	Dark and feathertop wiregrass, erect kerosene grass, barbwire grass, mountain wanderrie, silky oil grass, lovegrasses, bottlewasher grasses, five-minute grass.
Annual grasses	Small burr grass.
Suitable sown pastures	Oversow with legumes; shrubby, Caribbean and Caatinga stylos.
Introduced weeds	
Soil	Red sandy loam (kandosols).

Description	***Surface*:** Firm to hard-setting; ***Surface texture*:** sandy clay loam to clay loam ***Subsoil texture*:** clay loam to light clay.
Water availability	Low
Rooting depth	0.6 to >1 m.
Fertility	Low total nitrogen; very low phosphorus.
Salinity	Non-saline
Sodicity	Non-sodic
pH	Neutral to acid.

Utilisation

20%

Enterprise

Breeding

Land use and management recommendations

Land use limitations

- Regrowth
- Phosphorus deficient.

Conservation features and related management

- Important water recharge areas.
- *Eucalyptus tenuipes* is at its northern limits of distribution on the Junee tableland and other tablelands in the Duaringa environments.
- Some areas are rich in 'wildflower species'. Some tablelands have important wetlands e.g. closed depressions, in an otherwise dry landscape.
- These tablelands should be kept as winter and drought pasture reserves.
- Stock grazing pressure should be managed through strategic placement of water points located off the tableland areas.
- Tree retention prevents hardening and leaching of the red soils.

Regional ecosystems

11.7.4, 11.5.9b-c.

Land units; Agricultural management unit; Soil associations

Land units (Gunn *et al* 1967; Story *et al* 1967) Lennox 1 & 2, Tichbourne 2, Monteagle 1, Humboldt 1, Junee 1 & 3, Durandella 1; Soil associations (Burgess 2003) Bills Hut, Red Cliff.

Eucalypts and bloodwood on sandy tableland

Landform	Mountains and ranges.
Woody vegetation	Silver-leaved ironbark, narrow-leaved ironbark, Moreton Bay ash, ghost gum, large-fruited bloodwood woodland. Understorey, where present, of red ash, wattles, heath myrtle, paperbark tea tree and quinine.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, kangaroo grass, hairy panic, desert bluegrass.
Intermediate	Golden beard grass.
Non-preferred	Barbwire grass, many-headed wiregrass, dark wiregrass, wanderrie grass, bottlewasher grasses, summer grass, fairy grass, lovegrasses, five-minute grass.
Annual grasses	Small burr grass, comet grass.
Suitable sown pastures	Oversow with legumes, shrubby, Caribbean, Caatinga stylos.
Introduced weeds	
Soil	Red and yellow sandy earths (tenosol).
Description	***Surface:*** Loose to firm; ***Surface texture***: sand or loamy sand; ***Subsoil texture*****:** sandy loam to sandy light medium clay.
Water availability	Very low.

Rooting depth	0.9 m
Fertility	Very low total nitrogen; very low phosphorus.
Salinity	Non-saline
Sodicity	Non-sodic
pH	Neutral to acid.
Utilisation	20%
Enterprise	Breeding
Land use and management recommendations	• Do not develop. • Stock conservatively to maintain good grasses.
Land use limitations	• Very low fertility. • Regrowth
Conservation features and related management	• Important water recharge areas. • The bloodwoods that dominate these woodlands flower early in season (usually by early December) and provide food source for a wide range of arboreal mammals (e.g. brushtail possums, sugar gliders, little red flying foxes) and migratory birds especially over-wintering small birds. Red-tailed black cockatoos are attracted to seed capsules. • Some areas provide habitat for rock wallabies and quail thrushes. • Light grazing is recommended for these woodlands with patch/mosaic burning.
Regional ecosystems	8.5.5, 11.5.12a, 11.5.7, 11.5.12, 11.5.18.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967; Story *et al* 1967) Lennox 2, Tichbourne 2, Degulla 1, Ronlow 2, Monteagle 1, Humboldt 1; Soil associations (Burgess 2003) Bills Hut.

Gum-topped box flats

Landform	Alluvial plains
Woody vegetation	Gum topped box open forest/woodland with occasional blackbutt and yapunyah.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Forest bluegrass, black speargrass, kangaroo grass, shot grass.
Intermediate	Golden beard grass, barbwire grass, pitted bluegrass.
Non-preferred	Wiregrass, lovegrass, poverty grass, reedgrass.
Annual grasses	
Suitable sown pastures	Rhodes grass, creeping bluegrass, Angleton grass, shrubby stylo, Caribbean stylo, pangola, Green panic, and siratro on better soils.
Introduced weeds	Giant rat's tail grass.
Soil	Grey or brown, bleached, silty-surfaced texture contrast soils (sodosols, kurosols).
Description	***Surface:*** Hard-setting; ***Surface texture:*** silty loam ***Subsoil texture:*** mottled, medium clay.
Water availability	Low
Rooting depth	0.5 m

Fertility	Low to moderate total nitrogen; low to moderate phosphorus.
Salinity	Low to moderate (0.5 m).
Sodicity	High (0.5 m).
pH	Alkaline, sometimes acid.
Utilisation	20%
Enterprise	Breeding and growing.

Land use and management recommendations

- Ensure dam banks are compacted.
- Fence dam walls to keep stock off.

Land use limitations

- Prone to gully erosion, particularly if subsoil exposed.
- Sensitive to over-stocking.
- Subject to local flooding.

Conservation features and related management

- Gum-topped box (*Eucalyptus moluccana*) provides important linkages through the landscape for resident and dispersing fauna species.
- These tall open forests are abundant in arboreal mammals (brushtail possum, koala, sugar gliders, greater gliders, squirrel gliders, powerful owls); species rich in avifauna, and many rare and threatened plant species.
- The 'hanging bark' of the box provide favoured food resources for birds like tree creepers and ground-foraging birds such as speckled warblers also frequent these woodlands.
- Maintain good ground cover and never overgraze these land types as the soils are sodic, dispersive and prone to gully erosion.

Regional ecosystems

8.11.8b, 9.12.26, 11.5.20, 11.9.13, 11.11.3c, 11.11.4c, 11.11.10a.

Land resource area

Alluvial plain – gum-topped box on sodic duplex soils (Forster in prep).

Lancewood - bendee - rosewood

Landform	Uplands, ranges and dissected ridges.
Woody vegetation	Generally pure communities of lancewood, bendee or rosewood. These low open forests may have emergent narrow-leaved ironbark, yapunyah, Queensland peppermint and understorey of emu apple, ironwood, turkey bush, soap bush, wattles.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Mulga oats, cotton panic, tableland couch, hairy panic.
Intermediate	Curly windmill grass, tall chloris, brigalow grass.
Non-preferred	Many-headed wiregrass, dark wiregrass, bottlewasher grasses, lovegrasses, summer grass, poverty grass.
Annual grasses	Small burr grass, armgrass, comet grass.
Common forbs	Flannel weeds, mulga fern (non-preferred).
Suitable sown pastures	Generally unsuitable for sown pastures.
Introduced weeds	
Soil	Shallow rocky soils (rudosols).
Description	***Surface*:** Firm to hard-setting; ***Surface texture*:** sand to sandy loam; ***Subsoil texture*:** no subsoil, overlies rock.
Water availability	Very low.

Rooting depth	Shallow
Fertility	Low total nitrogen, low phosphorus.
Salinity	Low
Sodicity	Non-sodic
pH	Acid

Utilisation

15%

Enterprise

Breeding

Land use and management recommendations

- Sustainable harvesting of timber for fence posts and rails.
- Potential groundwater recharge area.

Land use limitations

- Very low soil fertility and moisture storage.
- Steep slopes.

Conservation features and related management

- As these scrubs occur on the upper slopes and ridges they play an important role in catchment protection.
- Substantial erosion hazards may occur if this land type is disturbed or over-grazed.
- The sedimentary ridges covered by these scrubs are likely to be important infiltration areas for groundwater in the region.
- These scrubs are important wildlife refuges, where animals such as black-striped wallabies and wallaroos have retreated from adjacent developed country.
- Where possible linkage of these scrubs to the riparian areas should be maintained or re-established to maintain landscape connectivity.
- Ideally the most sympathetic grazing management for conservation of these land types is to keep them aside for winter or drought reserves.
- This land types is very susceptible to fire damage so fire breaks are recommended.

Regional ecosystems

8.11.9, 8.12.10a-b, 8.12.29c, 11.5.10. 11.7.1, 11.7.2, 11.7.5a, 11.7.7, 11.8.7, 11.10.3, 11.11.2, 11.12.1b, 11.12.18a, 12.12.19x1, 12.12.19x2, 12.12.19x3.

Land units; Agricultural management unit; Soil associations

Land units (Gunn *et al* 1967) Durrandella 2, Loudon 2 and 3, Carborough 1 and 2, Copperfield 1; AMU (DPI 1993) Highlands; Soil associations (Burgess 2003) Bellarine, Cherwell, Maywin.

Marine plains

Landform	Marine plains.
Woody vegetation	Mangrove associations.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.* *@ Denotes non-grass species that are important to grazing and land condition values in estuarine wetland land types.*
Preferred	Marine couch, samphire@, fresh water couch.
Intermediate	Fringe rush@
Non-preferred	Sedges@
Annual grasses	
Suitable sown pastures	Ponded pastures (where existing) permitted; limited options for sown pastures on associated sand ridges.
Introduced weeds	
Soil	Deep saline grey cracking clay (vertosol).
Description	***Surface*:** Hard or crusting; ***Surface texture*:** medium to heavy clay; ***Subsoil texture:*** mottled heavy clay.
Water availability	High for adapted plants.

Rooting depth	Moderate (0.5 m) for adapted plants.
Fertility	Moderate to high total nitrogen; Moderate to high phosphorus.
Salinity	Very high (below surface).
Sodicity	Very high (>0.3 m).
pH	Alkaline

Utilisation

30%

Enterprise

Growing and finishing.

Land use and management recommendations

- Grazing.
- Areas with fresh to brackish water swamps and freshwater couch, sedges and reeds have higher productivity than marine plains mainly with marine couch and bare areas.

Land use limitations

- Clay pans restrict pasture growth.
- Grazing leases below the high tide mark are under review.

Conservation features and related management

- Mangroves are a protected plant species.
- Waterbirds are the most conspicuous component of the fauna of marine plains. These areas provide abundant food in the dense cover, and in the more open areas, for most of the major waterbird groups.
- A key strategy for grazing management is for fencing that enables wetlands to be excluded from grazing at strategic times, particularly when their edges are soft and liable to deep plugging and when wetland plants have not yet completed the seeding stage.
- Where exotic pasture grasses, such as para grass and hymenachne have become established, an appropriate level of grazing pressure on these grasses will be necessary to ensure they do not spread and overrun the area to the exclusion of native plants.

Regional ecosystems

7.1.1, 7.1.2a, 11.1.1, 11.1.2, 11.1.2a-b, 11.1.3, 11.1.3a, 11.1.4, 11.1.4a-d, 12.1.1, 12.1.2, 12.1.3, 12.1.3f, 12.1.3g.

Land units; Agricultural management unit; Soil associations

Mountain coolibah woodlands

Landform	Undulating downs.
Woody vegetation	Mountain coolibah open woodland with occasional silver-leaved ironbark and gum-topped bloodwood. Black tea tree occurs along drainage lines. Understorey is generally sparse, but shrubby layer of currant bush, Leichhardt bean, black wattle, corkwood wattle, bauhinia, emu apple, limebush or boonaree may develop in some areas.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Kangaroo grass, black speargrass, Queensland bluegrass, desert bluegrass, forest bluegrass, cotton panic, silky browntop.
Intermediate	Pitted bluegrass, native millet, yabila/star grass, barbwire grass, curly windmill grass.
Non-preferred	White speargrass, feathertop wiregrass, fairy grass, bottlewasher grasses, lovegrasses.
Annual grasses	Flinders grass, button grass.
Suitable sown pastures	Angleton grass, Bambatsi panic, creeping bluegrass, butterfly pea (>90 cm) and Caatinga stylo on deeper soils. Caribbean and shrubby stylos on shallow and rocky soils.
Introduced weeds	Parthenium, mimosa.
Soil	Self-mulching brown or black cracking clay (brown or black vertosol).
Description	***Surface*:** Strong and fine self-mulching, common basaltic fragments; ***Surface texture*:** medium clay; ***Subsoil texture***: medium to heavy clay.

Water availability	Low
Rooting depth	Below 45 cm.
Fertility	Low to moderate total nitrogen, low to moderate phosphorus.
Salinity	Low
Sodicity	Non-sodic
pH	Strongly alkaline.

Utilisation

20%

Enterprise

Growing and finishing.

Land use and management recommendations

- In open areas, fire is only useful to remove older (rank) grass.
- Burning should occur only after adequate rainfall; a dry, hot fire could kill the grass.

Land use limitations

- Not usually suited to cropping as soils are too shallow.
- Parthenium weed invasion potential.

Conservation features and related management

- In the Springsure area these woodlands are associated with a rare ironbark (*Eucalyptus sicilifolia)* that has a very restricted distribution.
- Woodlands provide good koala and spectacled-hare wallaby habitat.
- The pebble-mound mouse is found in this land type. The pebble-mound mouse forms little stone volcano-like craters/mounds and they access entrances to a burrow system under these mounds.
- Even though these areas are usually on rocky and high slopes it is possible that they can become overgrazed with severe shrub regrowth occurring at the base of the mountain coolibah trees.
- It is important to stock these areas according to their capacity, especially where they occur as small remnants in cultivated paddocks.
- If overgrazed these areas can become severely infested with parthenium that could spread down slope during wet seasons.

Regional ecosystems

11.4.13, 11.8.2, 11.8.5, 11.8.5a, 11.9.2, 11.11.11, 11.12.2a.

Land units; Agricultural management unit; Soil associations

Land units (Gunn *et al* 1967; Story *et al* 1967) Waterford 1, Oxford 1, Craven 3, Kinsdale 2, Bedourie 1, Girrah 1; AMU (DPI 1993) Orion, Jimbaroo; Soil associations (Burgess 2003) Carfax, Kirkcaldy.

Narrow-leaved ironbark on ranges

Landform	Mountains and ranges.
Woody vegetation	Narrow-leaved ironbark woodlands with bloodwood and occasional ghost gum. Often an understorey of rosewood, red ash, turkey bush, currant bush, hopbush.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition"' species.*
Preferred	Black speargrass, kangaroo grass, desert bluegrass, hairy panic, finger panic grass, tableland couch, forest bluegrass.
Intermediate	Golden beard grass, barbwire grass, pitted bluegrass, brigalow grass, curly windmill grass.
Non-preferred	Dark wiregrass, many-headed wiregrass, wanderrie grass, bottlewasher grasses, summer grass, fairy grass, five-minute grass, lovegrasses.
Annual grasses	Button grass, small burr grass.
Common forbs	Mulga fern, flannel weeds (non-preferred).
Suitable sown pastures	Oversow with legumes; shrubby and Caribbean stylos.
Introduced weeds	
Soil	Shallow rocky soils (rudosols).
Description	***Surface*:** Stoney; ***Surface texture*:** variable; ***Subsoil texture*:** no sub-soil.
Water availability	Low

Rooting depth	Less than 45 cm.
Fertility	Low total nitrogen, low to moderate phosphorus.
Salinity	Low
Sodicity	Non-sodic
pH	Neutral
Utilisation	20%
Enterprise	Breeding
Land use and management recommendations	• Much of this land type is in forestry reserves. • Not suitable for clearing. • Extensive grazing only.
Land use limitations	• Low fertility. • Low pasture production. • Steep slopes.
Conservation features and related management	• This woodland is an important wildlife habitat with a surprisingly wide range of fauna including: koalas that eat narrow-leaved ironbark leaves; whiptail wallabies; possums and gliders that use tree hollows; for skinks, geckoes and dragons that use rough fissured bark; and ground fauna (e.g. painted button-quail) that use good grass cover which also protects slopes and hillsides from erosion. • Burning too frequently can result in eucalypts never developing beyond the sapling stage and a reduction in mature trees. • Retention of mature trees is necessary, as only long-lived trees will form hollows. • Burning should not occur more frequently than once every three years and should take place in winter or just prior to summer rains. • To maintain a diversity of habitat for wildlife it is better to burn patches rather than large areas. • Where these woodlands are grazed it is better to burn at a paddock level to prevent overgrazing of fresh growth. • Similarly with other woodland communities, mosaic burning for regeneration and retention of microhabitats is critical for maintaining species richness. • Maintain good ground cover to minimise increases in understorey shrub density (e.g. hopbush, turkey bush, currant bush).
Regional ecosystems	8.10.1a-d, 8.11.7, 11.10.1d, 11.10.5, 11.10.4a-b, 11.10.7, 11.10.7a, 11.12.1, 11.12.1a, 11.12.13.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967; Story *et al* 1967) Bogantungan 1 and 2, Playfair 2, Cotherstone 6, Copperfield 2 and 3; AMU (DPI 1993) Highlands; Soil associations (Burgess 2003) Middlemount.

Narrow-leaved ironbark with rosewood

Landform	Mountains and ranges.
Woody vegetation	Narrow-leaved ironbark woodlands with bloodwood and occasional ghost gum. Often an understorey of rosewood, red ash, turkey bush, currant bush, hopbush.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, kangaroo grass, desert bluegrass, hairy panic, finger panic grass, tableland couch, forest bluegrass.
Intermediate	Golden beard grass, barbwire grass, pitted bluegrass, brigalow grass, curly windmill grass.
Non-preferred	Dark wiregrass, many-headed wiregrass, wanderrie grass, bottlewasher grasses, summer grass, five-minute grass, fairy grass, lovegrasses.
Annual grasses	Button grass, small burr grass.
Common forbs	Mulga fern, flannel weeds (non-preferred).
Suitable sown pastures	Unsuitable for sown pastures.
Introduced weeds	
Soil	Shallow stony soils (rudosols).
Description	***Surface*:** variable; ***Surface texture*:** variable; ***Subsoil texture*:** no sub-soil.
Water availability	Low

Rooting depth	Less than 45 cm.
Fertility	Low total nitrogen, low to moderate phosphorus.
Salinity	Low
Sodicity	Non-sodic
pH	Neutral
Utilisation	15%
Enterprise	Breeding
Land use and management recommendations	• Not suitable for clearing. • Extensive grazing only. • Dense stands of rosewood limit their own progression to maturity and are suitable for selective logging for fencing material.
Land use limitations	• Low fertility. • Low pasture production. • Steep slopes. • Sandy soils are easily eroded.
Conservation features and related management	• This woodland is an important wildlife habitat with a surprisingly wide range of fauna including koalas that eat narrow-leaved ironbark leaves; whiptail wallabies; possums and gliders that use tree hollows; for skinks, geckoes and dragons that use rough fissured bark; and ground fauna (e.g. painted button-quail) that use good grass cover which also protects slopes and hillsides from erosion. • Burning too frequently can result in eucalypts never developing beyond the sapling stage; increased rosewood undergrowth with a loss of grass cover; and a reduction in mature trees. • Burning should not occur more frequently than once every three years and should take place in winter or just prior to summer rains. • To maintain a diversity of habitat for wildlife it is better to burn patches rather than large areas. • Where these woodlands are grazed it is better to burn at a paddock level to prevent overgrazing of fresh growth.
Regional ecosystems	11.11.1.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967; Story *et al* 1967) Bogantungan 1 and 2, Hope 1, Playfair 2, Cotherstone 6; AMU (DPI 1993) Highlands.

Narrow-leaved ironbark woodlands

Landform	Eucalypt duplex plains.
Woody vegetation	Narrow-leaved ironbark, lemon-scented (spotted) gum, large-fruited bloodwood, pink bloodwood and ghost gum woodland. Paperbark tea tree, quinine tree, red ash, heath myrtle and occasional lancewood, bulloak, rosewood and wattles occur in the understorey.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, kangaroo grass, desert bluegrass, hairy panic, forest bluegrass.
Intermediate	Golden beard grass, pitted bluegrass, windmill grasses, barbwire grass, brigalow grass.
Non-preferred	Many-headed wiregrass, dark wiregrass, wanderrie grass, bottlewasher grasses, summer grass, fairy grass, five-minute grass, lovegrasses.
Annual grasses	Small burr grass, armgrass.
Suitable sown pastures	Oversow with legumes; shrubby and Caribbean stylos.
Introduced weeds	
Soil	Hard-setting, loamy surfaced texture contrast soil (chromosol).
Description	***Surface*:** Firm to hard-setting; ***Surface texture*:** sandy; ***Subsoil texture*:** sandy to sandy clay loam.
Water availability	Very low.

Rooting depth	Less than 0.60 m.
Fertility	Low to moderate total nitrogen; low phosphorus.
Salinity	Low
Sodicity	Non-sodic
pH	Neutral to strongly acid.
Utilisation	20%
Enterprise	Breeding
Land use and management recommendations	• Not suitable for clearing. • Commercial timber species are useful for construction purposes.
Land use limitations	• Shallow soil. • Hard-setting surface. • Prone to erosion if disturbed.
Conservation features and related management	• This woodland is an important wildlife habitat with a surprisingly wide range of fauna including koalas that eat narrow-leaved ironbark leaves; whiptail wallabies; possums and gliders that use tree hollows; for skinks, geckoes and dragons that use rough fissured bark; and ground dwelling fauna (e.g. painted button-quail, rufous bettongs, frilled-neck lizards) that use good grass cover which also protects slopes and hillsides from erosion. • Burning too frequently can result in eucalypts never developing beyond the sapling stage; increased wattle undergrowth with a loss of grass cover; and a reduction in mature trees. • Burning should not occur more frequently than once every three years and should take place in winter or just prior to summer rains. • To maintain a diversity of habitat for wildlife it is better to burn patches rather than large areas. • Where these woodlands are grazed it is better to burn at a paddock level to prevent overgrazing of fresh growth.
Regional ecosystems	8.12.14d, 11.10.4, 11.3.36, 11.5.2, 11.5.9, 11.9.9, 11.11.4, 11.11.4b, 11.11.4d, 11.11.15, 11.11.15a, 11.12.3, 12.11.7.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967; Story *et al* 1967) Copperfield 2 and 3, Hope 1, Cotherstone 1, Durandella 6, Rewan 1 and 2; AMU (DPI 1993) Highlands; Soil Associations (Burgess 2003) Maywin, Red-one, Anncrouye.

Open downs

Landform	Undulating downs.
Woody vegetation	Treeless plains with occasional mountain coolibah, bloodwood, silver-leaved ironbark, brigalow, black tea tree (in some drainage lines) and wattles.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Queensland bluegrass, king bluegrass, curly, bull and hoop Mitchell grass, umbrella grass, satintop grass.
Intermediate	Native millet, yabila/star grass, curly windmill grass.
Non-preferred	White speargrass, feathertop wiregrass, fairy grass, coolibah grass, bottlewasher grasses.
Annual grasses	Flinders grass, liverseed grass, weeping lovegrass.
Suitable sown pastures	Purple pigeon grass, Angleton grass, Bambatsi panic, leucaena (on deeper soils >100 cm), butterfly pea (>90 cm), Desmanthus, Caatinga stylo.
Introduced weeds	Parthenium, mimosa, prickly acacia.
Soil	Black or brown cracking clay (black or brown vertosol).
Description	***Surface*:** Strong and fine self-mulching; ***Surface texture*:** medium to heavy clay; ***Subsoil texture*:** medium to heavy clay.
Water availability	Moderate to high.
Rooting depth	Usually around 75 cm, occasionally shallow (45 cm).
Fertility	Low to moderate total nitrogen; low to moderate phosphorus.
Salinity	Low to high (depending on landscape position).

Sodicity	Non-sodic
pH	Strongly alkaline.
Utilisation	30%
Enterprise	Finishing
Land use and management recommendations	• Suitable for cropping on soils deeper than 45 cm and on slopes less than 4%. • Tea tree should not be cleared (to minimise saline seepages). • Maintain surface cover to minimise erosion. • In open areas, fire is only useful to remove older (rank) grass. Burning should occur only after adequate rainfall as a dry, hot fire could kill the grass. • This land type has some potential for pasture improvement.
Land use limitations	• Soil erosion hazard when cultivated. • Rooting depth (in some shallow soils). • Some rockiness. • Low fertility. • Establishment problems with some small seeded plants and pastures. • High water tables in tea tree drainage lines.
Conservation features and related management	• These grasslands provide vital habitat for a diverse range of plants and animals including the rare and threatened species king bluegrass (*Dichanthium queenslandicum*) and the daisy *Trioncinia retroflexa.* • Any existing patches of downs on the edges of a cultivated area are important wildlife refuges. • Grass owls can be found in ungrazed areas such as road reserves. • The grass tussocks and deep cracking clay soils provide a critical habitat for grassland dependent birds (e.g. brown quail, golden-headed cisticola), and have historically provided habitat for the presumed extinct legless lizard – Allan's lerista. • Good grass cover helps protect soils from erosion, salinity and they improve water quality by reducing runoff and stream sediment. • Avoid burning during dry months. As a rule of thumb, introduce 'cool' burns after heavy rain. Burn bluegrass pastures approximately every five to ten years. • These grasslands are readily infested with parthenium, especially when ground cover becomes too low. • Spell degraded bluegrass pastures during summer months and allow them to seed before re-stocking the paddocks. • Where bluegrass pastures are in good condition maintain the existing management practises.
Regional ecosystems	11.3.21, 11.4.4, 11.8.11, 11.8.11a, 11.9.3, 11.9.3a, 11.9.12, 11.11.17, 11.12.2c.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967; Story *et al* 1967) Avon 1, funnel 2, Kinsale 5, Mantuan 2, Oxford 2 and 3, Waterford 2, Racecourse 3; AMU (DPI 1993) Orion, Kia-Ora; Soil Associations (Shields *et al* 1993; Burgess 2003) May, May shallow phase, Mt Stuart, Russell, Diamond, Falkner.

Poplar box with shrubby understorey

Landform	Plains and rises.
Woody vegetation	Poplar box woodland with an understorey of false sandalwood, currant bush, brigalow, Leichhardt bean, and scrub leopardwood.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Desert bluegrass, black speargrass, kangaroo grass, cotton panic grass.
Intermediate	Golden beard grass, pitted bluegrass, curly windmill grass, native millet.
Non-preferred	Wiregrasses, purple lovegrasses, bottlewasher grasses, five-minute grass.
Annual grasses	Small burr grass.
Common forbs	Pigweed, flannel weeds (non-preferred).
Suitable sown pastures	Buffel grass, creeping bluegrass, shrubby stylo, Caribbean stylo.
Introduced weeds	Giant rat's tail grass.
Soil	Grey (or occasionally brown) texture contrast soils (sodosols).
Description	***Surface*:** Firm to hard-setting; ***Surface texture*:** sand to sandy clay loam; ***Subsoil texture*:** light to medium clay.
Water availability	Low

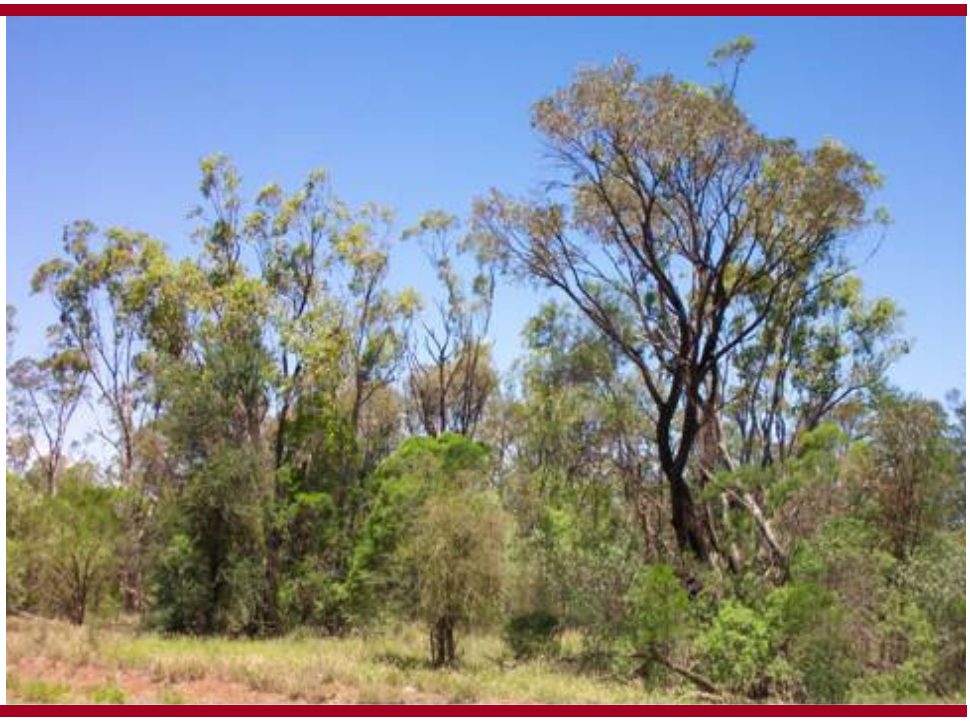
Rooting depth	60 cm
Fertility	Low to moderate total nitrogen, low to moderate phosphorus.
Salinity	Low
Sodicity	Strongly sodic >60 cm.
pH	Neutral to acid.
Utilisation	20%
Enterprise	Breeding and growing (occasionally finishing).
Land use and management recommendations	• Whoa boys are required on roads/tracks to control erosion. • Unsuitable for any clearing due to severe regrowth problems. • Unsuitable for cropping.
Land use limitations	• High levels of regrowth. • Low soil fertility. • Very highly erodible soils with dispersible subsoils in some cases. • Construction of dams can be a problem due to the tendency of the soil to disperse/tunnel when wet. • Low soil moisture storage. • Hard-setting surface soils.
Conservation features and related management	• These woodlands, with large hollow-bearing trees, associated fallen timber, and floristically diverse understorey, provide habitat for a range of fauna. • Many of the declining woodland bird species (e.g. hooded robin, grey-crowned babbler, brown treecreeper, granivorous birds); bats; terrestrial and arboreal mammals (e.g. koalas, squirrel gliders, sugar gliders, common brushtail possum, rufous bettong); and some restricted reptiles all reside in this land type. • Should thinning occur, it is important to leave some areas undisturbed to provide multiple layers and variety of shrubs that are vital habitat component for fauna. • Overgrazing should be avoided as the subsoils are very dispersive and erosive.
Regional ecosystems	11.5.3b, 11.8.15, 11.9.7, 11.9.7a, 11.10.12, 11.11.9, 11.12.17.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967) Monteagle 4, Skye 3, Disney 2, Degulla 3, Craven 2; AMU (DPI 1993) Lascelles; Soil Associations (Shields *et al* 1993; Burgess 2003) Collawmar, Foxleigh clay loamy phase, Emoh, Honeycomb, Lebanon, Heyford.

Poplar box with ironbark

Landform	Eucalypt duplex uplands.
Woody vegetation	Poplar box, silver-leaved ironbark or narrow-leaved ironbark woodland, with occasional vine tree, ironwood, ghost gum, Clarkson's bloodwood. Generally an understorey of false sandalwood, currant bush, Leichhardt bean, scrub leopardwood, quinine tree, and wattles is present.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Desert bluegrass, black speargrass, kangaroo grass, cotton panic.
Intermediate	Golden beard grass, native millet, curly windmill, tall chloris.
Non-preferred	Wiregrasses, purple lovegrass, bottlewasher grasses, five-minute grass.
Annuals	Small burr grass.
Common forbs	Flannel weeds (non-preferred).
Suitable sown pastures	Buffel grass, creeping bluegrass, shrubby stylo, Caribbean stylo.
Introduced weeds	
Soil	Red or brown hard-setting, loamy surfaced, texture contrast or gradational texture change soil (kandosols or chromosols).
Description	***Surface*:** Firm to hard-setting; ***Surface texture***: sandy loam to clay loam; ***Subsoil texture***: medium clay to medium heavy clay.
Water availability	Low

Rooting depth	60–80 cm.
Fertility	Low total nitrogen; low phosphorus.
Salinity	Moderate below 60–90 cm.
Sodicity	High below 30 cm.
pH	Neutral to acid.
Utilisation	20%
Enterprise	Breeding and growing.
Land use and management recommendations	• Whoa boys are required on roads/tracks to control erosion.
Land use limitations	• Low fertility. • Hard-setting surface soils. • Highly erodible soils with dispersible subsoils. • Construction of dams can be a problem due to the tendency of the soil to disperse/tunnel when wet. • Low moisture storage. • High levels of regrowth.
Conservation features and related management	• Older silver-leaved ironbark trees frequently have hollows favoured by arboreal marsupials (e.g. brushtail possums) and provide nest sites for a wide range of birds (e.g. owlet nightjars, owls and parrots). The deep-fissured bark provides shelter for reptiles, such as tree skinks. Generally the good grass cover provides shelter and food for ground dwelling animals (e.g. spectacled hare-wallabies, rufous bettongs). • Trees are important in the cycling of nutrients from deeper in the soil profile. • Patch burning of these woodlands in the late winter months is preferable. • Some burning prior to summer rains may be required on grazed areas to prevent excessive grazing pressure on new growth. • Mature trees can easily be burnt through at the base and, as such, frequent burning can lead to loss of these important habitat trees. Care should be taken to extinguish fires that persist at the base of old trees. • Due to the potential erosion hazard of these duplex soils good ground cover should be retained on slopes and drainage lines.
Regional ecosystems	11.4.12, 11.5.3.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967) Pinehill 1, Durrandella 3; AMU (DPI 1993) Lascelles; Soil Associations (Shields *et al* 1993; Burgess 2003) Adeline, Wieta, Bundoora, Heyford, Foxleigh, Mayfair sandy surfaced variant.

Poplar box / brigalow / bauhinia



Landform	Uplands.
Woody vegetation	Poplar box woodland with brigalow scrub and occasional bauhinia or wilga, silver-leaved ironbark, bloodwood or ghost gum. Understorey of false sandalwood, turkey bush, ironwood, quinine, myrtle, red ash, scrub leopardwood, early flowering black wattle and currant bush.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, cotton panic, desert bluegrass
Intermediate	Pitted bluegrass, brigalow grass, Warrego grass, barbwire grass, shot grass.
Non-preferred	Dark wiregrass, purple lovegrass, woodland lovegrass.
Annual grasses	Small burr grass.
Common forbs	Galvanised burr (non-preferred).
Suitable sown pastures	Buffel grass, creeping bluegrass, shrubby stylo, Caribbean stylo.
Introduced weeds	Parthenium
Soil	Red or yellow texture contrast soil (sodosol).
Description	***Surface*:** Firm to hard-setting; ***Surface texture*:** sandy to sandy clay loam; ***Subsoil texture*:** light to medium clay.
Water availability	Low
Rooting depth	60 cm

Fertility	Moderate total nitrogen, moderate phosphorus.
Salinity	Low
Sodicity	Strongly sodic below 60 cm
pH	Neutral to acid.
Utilisation	25%
Enterprise	Growing and finishing.
Land use and management recommendations	
Land use limitations	• Highly erodible • Hard-setting • Regrowth • Bulloak patches should not be cleared as they grow on poorer soils that have soil structure problems that result in scalded areas when disturbed.
Conservation features and related management	• These woodlands are structurally and floristically very rich and provide habitat for a wide range of animals. An abundance of woody debris and ground litter provide habitat for reptile species such as legless lizards, skinks, black-headed pythons, tree monitors. Pheasant coucals, speckled warblers, fairy wrens and finches abound. Bauhinia trees are seasonally important for several types of butterflies such as the caper white and 'other' mistletoe butterflies. The good camouflage provides security for the elusive swamp wallaby. • The poplar box woodlands are likely to have a good body of buffel and native pastures. These pastures need to be maintained and should be carefully grazed to ensure their survival as they are most valuable for wildlife and long-term sustainable production. If thinning spiny shrubs such as *Citrus glauca* or *Capparis* species – keep as many as possible as these are important for animal and insect habitat especially butterflies.
Regional ecosystems	11.3.17, 11.9.10.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967, Story *et al* 1967) Pinehill 2, Playfair 4, Skye 3 & 4, Barwon 1; AMU (DPI 1993) Glengallan; Soil Associations (Shields *et al* 1993; Burgess 2003) Adeline, Wieta, Bundoora, Heyford, Foxleigh, Mayfair sandy surfaced variant.

Serpentine ironbark

Landform	Plains and hills.
Woody vegetation	Serpentine ironbark and serpentine bloodwood woodland with grass tree, tree zamia and wattle understorey.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, hairy panic grass, buck spinifex on some slopes.
Intermediate	Barbwire grass, pitted bluegrass.
Non-preferred	Wiregrass (e.g. feathertop), white speargrass, lovegrass, slender chloris.
Annual grasses	
Suitable sown pastures	Not suitable for sown pastures.
Introduced weeds	Giant rat's tail grass.
Soil	Shallow, stony black or brown non-cracking clay (dermosol). Soils generally have high concentrations of elements such as iron, nickel, magnesium and chromium.
Description	***Surface:*** Fine granular; ***Surface texture****:* light clay; ***Subsoil texture:*** medium clay.

Water availability	Low
Rooting depth	0.2–0.5 m.
Fertility	Low total nitrogen; low phosphorus; high magnesium and heavy metals.
Salinity	Low
Sodicity	Low
pH	Neutral

Utilisation

15%

Enterprise

Breeding and growing.

Land use and management recommendations

- Regrowth of wattles, eucalypts and other shrubs.

Land use limitations

- Low fertility.
- Potential calcium magnesium imbalance, particularly in lactating cows.
- Stock grazing zamia areas may develop rickets.

Conservation features and related management

- These woodlands are floristically very rich with a large number of plants species, that have adapted to the difficult soil conditions (low concentrations of plant nutrients and high concentrations of elements), only occurring in these areas. These include the threatened plant species *Corymbia xanthope, Hakea trineura, Capparis thozetiana, Leucopogon cuspidatus, Neoroepera buxifolia, Pimelea leptospermoides, Pultenaea setulosa, Stackhousia tryonii, Marsdenia brevifolia, Cycas ophiolitica, Bursaria reevesii, Capparis humistrata* and *Macrozamia serpentine*.
- These woodlands provide habitat for an endemic gecko.
- To prevent degradation of habitat, lightly graze these areas only and avoid regular fires that promote young growth at too frequent an interval for recovery.

Regional ecosystems

11.11.7, 11.11.7a, 11.11.7x1.

Land units; Agricultural management unit; Soil associations

Silver-leaved ironbark on duplex

Landform	Plains.
Woody vegetation	Open woodlands of silver-leaved ironbark, narrow-leaved ironbark, bloodwood, mountain coolibah. False sandalwood, prickly pine, dead finish, desert oak, vine tree and currant bush understorey.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Desert bluegrass, black speargrass, kangaroo grass, Queensland bluegrass, forest bluegrass.
Intermediate	Pitted bluegrass, barbwire grass, native millet.
Non-preferred	Feathertop wiregrass, dark wiregrass, white speargrass, bottlewasher grasses, five-minute grass.
Annuals	Small burr grass, comet grass.
Common forbs	Pigweed, flannel weeds (non-preferred).
Suitable sown pastures	Shrubby stylo, Caribbean stylo, creeping bluegrass, buffel grass.
Introduced weeds	Parthenium
Soil	Texture contrast soils (sodosols, chromosols).
Description	***Surface*:** Firm to hard-setting (sometimes gravely); ***Surface texture*:** sandy clay loam to clay loam; ***Subsoil texture*:** light to medium clay.

Water availability	Low
Rooting depth	60–100 cm (variable).
Fertility	Low total nitrogen, low phosphorus.
Salinity	Low
Sodicity	B horizon strongly sodic.
pH	Neutral to alkaline.

Utilisation

25%

Enterprise

Breeding and growing.

Land use and management recommendations

- Tall straight narrow-leaved ironbark useful timber.

Land use limitations

- Subsoil very erosive when exposed.
- Highly erodible soils with dispersible subsoils in some cases.
- Regrowth
- Low soil moisture.
- Low soil fertility.
- Hard-setting surface soils.
- Stock grazing zamia areas may develop rickets.

Conservation features and related management

- The open ironbark woodlands, as with box woodlands, are widespread and important for wildlife, supporting diverse vertebrate fauna in particular terrestrial mammals (e.g. koala, squirrel glider, common brushtail possum, bandicoots, spectacled hare-wallaby, desert mouse (*Pseudomys desitor*) and reptiles (e.g. the tree skink, *Egernia striolata,* especially favours the fissured bark).
- This habitat supports a very high number of declining woodland bird species (e.g. square-tailed kite, Australian bustard, bush stone-curlew, squatter pigeon, hooded robin, grey-crowned babbler, brown treecreeper).
- It is important to keep good ground cover as this provides shelter and food for many ground dwelling animals.
- Patch burning is ideal as this provides a good balance of fresh pick as a food resource and well-formed tussocks as shelter.
- If cell grazing is practised it is ideal that some areas remain ungrazed as this infrequent, high disturbance has significant impacts on ground fauna dependant on good ground cover.

Regional ecosystems

11.3.6, 11.3.39, 11.5.5c, 11.5.9a, 11.8.4, 11.12.2.

Land units; Agricultural management unit; Soil associations

Land units (Gunn *et al* 1967; Story *et al* 1967) Peak Vale 2, Craven 1, Hope 2, Rutland 3, Moorooloo 1, Cotherstone 3, Hillalong 1; AMU (DPI 1993) Duckponds, Highlands; Soil Associations (Burgess 2003) Mayfair, Red-one.

Softwood scrub

Landform	Undulating plains.
Woody vegetation	Bonewood scrub with emergent wilga, bottletree, ooline, bauhinia and Crow's ash. Understorey of croton, holly bush and currant bush.
Expected pasture composition	*In an uncleared state, there is little grass.* ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Buffel grass*
Intermediate	Brigalow grass
Non-preferred	Lovegrasses, speargrass.
Annual grasses	
Suitable sown pastures	Buffel grass, Gatton panic, Green panic, Angleton grass, digit grass, tall finger grass, sabi grass, creeping bluegrass, Rhodes grass, butterfly pea, leucaena, Caatinga stylo, Desmanthus.
Introduced weeds	Parthenium, lantana, rubbervine.
Soil	Brown clays (vertosols, chromosols) or deep red clays (ferrosol).
Description	***Surface*:** Weak self-mulching, scattering of stone (brown clays), or friable (red clays); ***Surface texture***: light to medium clay (brown clays), clay loam to light clay (red clays); ***Subsoil texture*:** medium clay.
Water availability	Moderate (red clays) to high (brown clays).
Rooting depth	Between 30 to 90 cm (brown clays) to >1 m (red clays).

Fertility	Moderate total nitrogen; moderate phosphorus.
Salinity	Nil (red clays), low (brown clays).
Sodicity	Non-sodic (red clays), non-sodic (below 30 cm) (brown clays).
pH	Strongly alkaline (brown clays); slightly acid surface, acid subsoil (red clays).
Utilisation	30% (sown)
Enterprise	Finishing
Land use and management recommendations	• Most areas of softwood scrub have been cleared and established to improved pastures. • Retain trees on beds and banks of watercourses. • Maintain vegetation belts for wildlife habitats and corridors. • Lantana and rubbervine need to be controlled using a combination of herbicides and fire.
Land use limitations	• Regrowth of some species. • Surface sealing soils.
Conservation features and related management	• This land type is very rare in the Fitzroy landscape and the remaining patches of scrub are critical to migratory birds such as grey fantails, varied trillers and rufous fantails. Sometimes used by fruit-eating pigeons and honeyeaters. • These scrubs provide important habitat and refuge areas for bush turkeys and black-striped wallabies in the dry interior. • Due to the friable red soils, when there is a good litter cover, a good diversity of reptiles can be found such as ornamental snakes, blind snakes and carpet pythons. • Softwood scrubs have a wide range of plant species at their inland limits of distribution. • This land type is very susceptible to fire and therefore a firebreak around its periphery is warranted; especially if adjoining a dense stand of buffel grass. • Burning around scrub margins should only be undertaken when fuels are not completely cured or at the coolest time of the year. • Burning should be conducted from the scrub margins out into surrounding vegetation, to reduce fire intensity at the scrub interface. • It may be necessary to manage overgrazing by wallabies through the use of netting or electric fences (with specifications that prevent harm to other animals).
Regional ecosystems	8.2.5, 8.3.1b, 8.12.3c, 8.12.11c, 8.12.16, 8.12.17b, 11.3.11, 11.4.1, 11.8.3, 11.8.6, 11.8.13, 11.9.4, 11.9.4a, 11.9.8, 11.10.4d, 11.10.8, 11.11.5, 11.11.5a, 11.11.18, 11.11.21, 11.12.4, 11.12.4a, 11.12.12, 12.11.4.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967; Story *et al* 1967) Cungelella 2 & 3, Kareela 2, Wharton 2, Bedourie 3, Racecourse 1; AMU (DPI 1993) Duckponds, Glen Idol.

Spotted gum ridges

Landform	Mountains and ranges.
Woody vegetation	Spotted gum forests or woodlands associated with narrow-leaved ironbark, lemon scented gum, and lancewood. An understorey of wattles, zamia, and red ash may be present.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, kangaroo grass, hairy panic, desert bluegrass.
Intermediate	Golden beard grass, pitted bluegrass, barbwire grass, windmill grasses.
Non-preferred	Many-headed wiregrass, dark wiregrass, wanderrie grass, bottlewasher grasses, summer grass, red Natal grass*, fairy grass, lovegrasses, five-minute grass.
Annual grasses	Small burr grass, armgrass.
Suitable sown pastures	Shrubby stylo.
Introduced weeds	
Soil	Shallow rocky texture contrast or gradational soils (tenosols or kandosols).
Description	***Surface*:** Firm to hard-setting; ***Surface texture*:** sand; ***Subsoil texture*:** sand to sandy clay loam.
Water availability	Very low.
Rooting depth	Less than 45 cm.

Fertility	Low total nitrogen; very low phosphorus.
Salinity	Low
Sodicity	Non-sodic
pH	Neutral to acid.
Utilisation	15%
Enterprise	Breeding and growing.
Land use and management recommendations	• The commercial timber species are useful for construction purposes.
Land use limitations	• Steep slopes. • Shallow soil. • Rocky surface.
Conservation features and related management	• Spotted gum (*Corymbia citriodora*) dry sclerophyll forests occur near hills and ranges, with almost homogenous stands of spotted gum often occurring in State forests and timber reserves. • At a landscape perspective, these forests now form the backbone of the largest stands of intact remnant habitat across the Brigalow Belt – all along the Expedition/Leichhardt/Dawson ranges. • These extensive spotted gum forests provide valuable resources for a suite of forest dependent fauna including possums and gliders (e.g. yellow-bellied glider, greater glider), koalas, forest owls (e.g. powerful owl), raptors (e.g. red goshawk), microbats (e.g. little pied bat), and insectivorous birds. Large fallen trees are good habitat for ground dwelling animals, and coral snakes and bandy-bandy snakes are also found here. This land type is seasonally important as a nectar/pollen source for bees. • Previously, forest management practices, including tree thinning and high frequency fire regimes, often led to evenly aged tree stands with low grass and coarse ground litter. • In recent years, due to the high number of rare and threatened species dependent on spotted gum dominated dry sclerophyll forests in Queensland, there has been much focus on the retention of over mature (senescent) trees that are critical habitat for hollow dependent species and mosaic burning for ground fauna. • On-going management should identify and retain habitat trees, including yellow-bellied glider feed trees, and recognise the microhabitat requirements of fauna species including the promotion of ground cover, retention of fallen log cover, and mosaic burning for species regeneration.
Regional ecosystems	8.11.8a, 8.12.7a-c, 11.5.9d, 11.7.5, 11.8.1, 11.10.1, 11.10.13, 11.10.13a, 11.10.2, 11.11.3, 11.11.4a, 11.12.6, 11.12.6a.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967, Story *et al* 1967) Bogantungan 1 & 2, Hope 1, Playfair 2, Cotherstone 6; AMU (DPI 1993) Highlands.

Yellowjacket country

Landform	Tableland.
Woody vegetation	Yellowjacket woodland with understorey of pretty wattle, desert oak and heartleaf poison bush.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Soft spinifex, black speargrass, silky umbrella grass, hairy panic, cotton panic, kangaroo grass, plume sorghum.
Intermediate	Golden beard grass, silky oil grass, white grass.
Non-preferred	Wiregrasses (particularly Jericho, dark), wanderrie grasses, buck spinifex, bottlewasher grasses, lovegrasses, five-minute grass.
Annual grasses	Fire grass, kerosene grass (non-preferred).
Common forbs	Flannel weeds (non-preferred).
Suitable sown pastures	Not suitable for sown pastures.
Introduced weeds	
Soil	Red sand (kandosol).

Description	***Surface*:** Firm to friable; ***Surface texture*:** sandy loam; ***Subsoil texture*:** sandy clay loam.
Water availability	Low
Rooting depth	0.6–0.9 m.
Fertility	Low total nitrogen; low phosphorus.
Salinity	Non-saline
Sodicity	Non-sodic
pH	Acid to neutral.
Utilisation	20%
Enterprise	Breeding
Land use and management recommendations	• Not suitable for development. • Recharge area.
Land use limitations	• Intake area for salinity management. • Heartleaf poison bush.
Conservation features and related management	• These woodlands provide important habitat trees for arboreal fauna. In some areas the number of larger sized habitat trees has decreased as a result of logging. • The woodlands provided habitat for rare and threatened flora species *Grevillea singuliflora, Homoranthus decumbens, Acacia chinchillensis* and *Dodonaea macrossanii*. Habitat for localised *Acacia johnsonii*. • These woodlands may include species with restricted and disjunct distributions including *Eucalyptus suffulgens* and *Corymbia bunites*.
Regional ecosystems	11.10.1a, 11.10.13b, 11.12.5, 11.12.20.
Land units; Agricultural management unit; Soil associations	Land units (Gunn *et al* 1967) Ronlow 1.