Inland Burnett Region Plant Index

Common name	Scientific name	Page
cat's claw creeper*	*Macfadyena unguis-cati*	IB02, IB04
Chinese elm*	*Celtis sinensis*	IB02, IB04
comet grass	*Perotis rara*	IB03, IB19
creeping bluegrass*	*Bothriochloa insculpta*	IB01, IB02, IB03, IB04, IB05, IB06, IB07, IB08, IB10, IB11, IB12, IB13, IB16, IB17, IB20
creeping lantana*	*Lantana montevidensis*	IB10
creeping tick trefoil	*Desmodium triflorum*	IB02, IB06, IB09, IB10, IB11, IB12
crow's ash	*Flindersia australis*	IB01, IB18
currant bush	*Carissa ovata*	IB05, IB06, IB19
cycad	Cycadaceae, Zamiaceae	IB11
dark wiregrass	*Aristida calycina*	IB01, IB02, IB04, IB05, IB06, IB07, IB08, IB09, IB10, IB12, IB13, IB14, IB16, IB17, IB19, IB20
Desmanthus*	*Desmanthus virgatus*	IB02, IB05, IB07, IB08, IB10, IB12, IB16
digit grass	*Digitaria eriantha* spp. *eriantha* cv. Premier	IB01, IB04, IB18, IB20
dogwood	*Jacksonia scoparia*	IB13, IB18
emu foot	*Psorakea tenax*	IB03, IB06, IB09, IB10, IB11, IB14
erect kerosene grass	*Aristida holathera*	IB10, IB11, IB14, IB19
false sandalwood	*Eremophila mitchellii*	IB05, IB06
feathertop Rhodes grass*	*Chloris virgata*	IB17
figs	*Ficus* spp.	IB01, IB18
fine stem stylo/s	*Stylosanthes hippocampoides* formerly *Stylosanthes guianensis* var. *intermedia*	IB03, IB14, IB17
five-minute grass	*Tripogon loliiformis*	IB19
forest bluegrass	*Bothriochloa ewartiana*	IB02, IB05, IB06, IB09, IB10, IB11, IB12, IB16
glycine pea	*Glycine tabacina*	IB01, IB02, IB03, IB04, IB05, IB07, IB12, IB13, IB14, IB15, IB16, IB17, IB18, IB19, IB20
golden beard grass	*Chrysopogon fallax*	IB03, IB14, IB17
Gatton panic*	*Panicum maximum*	IB01, IB07, IB10, IB18

Common name	Scientific name	Page
green panic*	*Panicum maximum* var. *trichoglume*	IB01, IB04, IB07, IB08, IB12, IB18, IB20
grevillea	*Grevillea* sp.	IB19
grey gum	*Eucalyptus biturbinata* (formerly *E. punctata)*	IB01, IB18, IB20
gum-topped bloodwood *see* variable-barked bloodwood		
gum-topped box	*Eucalyptus moluccana*	IB01, IB05, IB06, IB09, IB13, IB19
Gympie messmate	*Eucalyptus cloeziana*	IB18, IB20
hairy panic	*Panicum effusum*	IB02, IB12, IB14, IB16
hooky grass	*Ancistrachne uncinulata*	IB01, IB04, IB07, IB13, IB20
hoop pine	*Araucaria cunninghamii*	IB01
Indian couch*	*Bothriochloa pertusa*	IB10, IB11
ironbark	*Eucalyptus* spp.	IB01, IB03, IB09, IB02, IB04, IB11, IB13, IB14, IB15, IB16, IB17, IB19, IB20
kangaroo grass	*Themeda triandra*	IB01, IB04, IB09, IB13, IB15, IB19, IB20
lantana*	*Lantana camara*	IB18, IB20
lantern bush*	*Abutilon grandifolium*	IB15, IB19
leafy panic	*Urochloa foliosa* syn. *Brachiaria foliosa*	IB01, IB04, IB07, IB13, IB20
leucaena*	*Leucaena leucocephala*	IB01, IB02, IB05, IB07, IB16, IB18, IB20
liverseed grass	*Urochloa panicoides*	IB02, IB12
many-headed wiregrass	*Aristida caput-medusae*	IB15, IB17
Moreton Bay ash	*Corymbia tessellaris*	IB02, IB04, IB12
mountain coolibah	*Eucalyptus orgadophila*	IB12
myrtle tree	*Canthium oleifolium*	IB09
narrow-leaved indigo	*Indigastrum parviflorum (*formerly *Indigofera parviflorum)*	IB15
narrow-leaved ironbark	*Eucalyptus crebra*	IB01, IB03, IB04, IB06, IB09, IB10, IB11, IB12, IB13, IB14, IB15, IB16, IB17, IB18, IB19, IB20
native millet	*Panicum decompositum*	IB03, IB08, IB16

Common name	Scientific name	Page
native oatgrass	*Themeda avenacea*	IB15, IB19
niggerheads	*Enneapogon nigricans*	IB14
paspalum*	*Paspalum dilatatum*	IB05, IB10, IB16, IB11
pink bloodwood	*Corymbia intermedia*	IB13
pitted bluegrass	*Bothriochloa decipiens*	IB03, IB05, IB06, IB09, IB10, IB11, IB14, IB15, IB17, IB19
poplar box	*Eucalyptus populnea*	IB05, IB06, IB09
purple lovegrass	*Eragrostis lacunaria*	IB01, IB04, IB07, IB13, IB20
Queensland blue gum	*Eucalyptus tereticornis*	IB01, IB02, IB03, IB04, IB09, IB10, IB12, IB13, IB14, IB16, IB17, IB18
Queensland bluegrass	*Dichanthium sericeum*	IB01, IB02, IB04, IB05, IB06, IB07, IB08, IB10, IB11, IB12, IB13, IB16, IB20
quinine berry*	*Petalostigma pubescens*	IB14
rattlepod	*Crotalaria* spp.	IB17, IB19
red ash	*Alphitonia excelsa*	IB18, IB19, IB20
red bloodwood *see* variable-barked bloodwood		
red Natal grass*	*Melinis repens*	IB03, IB14, IB17
reedgrass	*Arundinella nepalensis*	IB01, IB04, IB13, IB14, IB17, IB20
Rhodes grass*	*Chloris gayana*	IB01, IB02, IB04, IB05, IB06, IB07, IB08, IB10, IB11, IB12, IB13, IB16, IB18, IB20
rhynchosia	*Rhynchosia minima*	IB02, IB05, IB06, IB08, IB10, IB12, IB16
rosewood	*Acacia rhodoxylon*	IB15
rough-barked apple	*Angophora floribunda*	IB02, IB04
rusty gum *see* smooth-barked apple		
scentedtop	*Capillipedium parviflorum, C. spicigerum**	IB02, IB05, IB06, IB10, IB11, IB12, IB16
she-oak	*Casuarina* sp.	IB18
shrubby stylo*	*Stylosanthes scabra* cvv. Seca, Siran	IB01, IB03, IB04, IB06, IB11, IB13, IB14, IB15, IB17, IB18, IB20
silky browntop	*Eulalia aurea*	IB08

Common name	Scientific name	Page
silky umbrella grass	*Digitaria ammophila*	IB03, IB06, IB14, IB17
silkyheads	*Cymbopogon obtectus*	IB10, IB11, IB19
silver-leaved ironbark	*Eucalyptus melanophloia*	IB02, IB03, IB04, IB10, IB12, IB13, IB14, IB15, IB16, IB17, IB18
siratro*	*Macroptilium atropurpureum*	IB07, IB18
slender chloris	*Chloris divaricata*	IB01, IB02, IB03, IB04, IB06, IB07, IB08, IB09, IB10, IB11, IB12, IB13, IB16, IB20
slender rat's tail grass	*Sporobolus creber*	IB01, IB04, IB07, IB13, IB20
small burr grass	*Tragus australianus*	IB02, IB05, IB06, IB09, IB12, IB16
smooth-barked apple	*Angophora leiocarpa*	IB06, IB09, IB13, IB18, IB19
spider grass (native couch)	*Brachyachne convergens*	IB06, IB09
spotted gum	*Eucalyptus citriodora* subsp. *variegata*	IB01, IB11, IB13, IB15, IB18, IB19, IB20
spring grass	*Eriochloa crebra*	IB02, IB08, IB12
swamp mahogany	*Lophostemon suaveolens*	IB01
tall chloris	*Chloris ventricosa*	IB08
tall finger grass*	*Digitaria millianjiana* cvv. Strickland, Jarra, Arnhem	IB01, IB04, IB18, IB20
tallowwood	*Eucalyptus microcorys*	IB18, IB20
umbrella canegrass	*Leptochloa digitata*	IB08
umbrella grass	*Digitaria divaricatissima*	IB02, IB09, IB12
variable-barked bloodwood	*Corymbia erythrophloia*	IB10, IB12, IB16
wattle	*Acacia* spp.	IB01, IB02, IB03, IB04, IB06, IB07, IB09, IB11, IB13, IB14, IB15, IB16, IB17, IB18, IB19, IB20
white cedar	*Melia azedarach*	IB01, IB18
white speargrass	*Aristida leptopoda*	IB15
whitewood	*Atalaya hemiglauca*	IB11, IB15
wilga	*Geijera parviflora*	IB06, IB07
wiregrass/es	*Aristida* spp.	IB01, IB02, IB04, IB05, IB06, IB08, IB09, IB12, IB13, IB14, IB18, IB19, IB20

Common name	Scientific name	Page
woodland lovegrass	*Eragrostis sororia*	IB10, IB11, IB14
woolly glycine	*Glycine tomentella*	IB01, IB02, IB04, IB05, IB06, IB07, IB08, IB09, IB10, IB11, IB12, IB13, IB14, IB16, IB18, IB20
Wynn cassia*	*Chamaecrista rotundifolia* cv. Wynn	IB03, IB04, IB14, IB17, IB18, IB20
Yarraman ironbark	*Eucalyptus melanoleuca*	IB01, IB18, IB20

* Denotes non-native species

Bastard scrub

Landform

Ridge crests; broad ridges; some scarp areas; upper, mid and lower slopes of undulating rises and low hills. Commonly slopes 3–10%, occasionally steep10–25% slopes, and in minor areas as steep as 45%.

Woody vegetation

Open forest to closed scrubs of softwood species (vines, bottle trees, white cedar, crow's ash, figs) and / or hoop pine and / or narrow-leaved ironbark open woodland. Other species may occur include Burdekin plum, Yarraman ironbark, gum-topped box, spotted gum, grey gum, brush box, swamp mahogany, Queensland blue gum.

Expected pasture composition

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

Preferred	Black speargrass, Queensland bluegrass, kangaroo grass, hooky grass, leafy panic.
Intermediate	Slender chloris, slender rat's tail grass.
Non-preferred	Wiregrasses (e.g. dark), purple lovegrass, reedgrass.
Legumes	Woolly glycine, glycine pea.

Suitable sown pastures

Rhodes grass, creeping bluegrass, green panic, Gatton panic, digit grass, tall finger grass, shrubby stylo, leucaena on deeper soils.

Introduced weeds

Soil

Red and brown non-cracking clays; deep (euchrozems), or shallow gravelly or snuffy (krasnozems) red clay loams; and red sandy loams (red earths).

Description	***Surface:*** firm, loose snuffy or friable, hard-setting; ***Surface texture:*** sandy loam to clay loam to light clay; ***Subsoil texture:*** sandy clay loam to light medium to medium heavy clay.
Water availability	Very low (red earths) to low (krasnozems); moderate (red clays) PAWC.
Drainage	Moderate (red clays) to well drained (krasnozems, red earths, euchrozems).
Rooting depth	Effective rooting depth 60–90 (red clays and earths), >100 cm (krasnozems, euchrozems).
Fertility	Medium. Low (red clays, red earths) to moderate (euchrozems) to high (krasnozems, red earths) nitrogen; very low to low or moderate phosphorus; moderate to very high potassium.

Salinity

Non-saline (krasnozems, euchrozems); very low throughout (red earths); moderate salinity below 70 cm (red clays).

Sodicity

Non-sodic (krasnozems, red earths, euchrozems); sodic to strongly sodic (red clays).

pH

Alkaline (red clays) or acid to neutral soil reaction trend.

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 676 – 726 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	3880 - 4280	30% (sown)	2.3 – 2.5
	17 TBA 41 FPC	1320 - 1940	30% (sown)	5.0 – 7.4

Enterprise

Breeding and fattening.

Land use and management recommendations

- Suitable for grazing of native and improved pastures and cropping.
- Maintenance of effective ground cover (>70%), use of minimum tillage and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on ridges, in drainage lines and at the base of hills to lower watertable and control salinity.
- Burning is recommended every 4–6 years to control regrowth (spotted gum, ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Cultivation can cause surface structure break down (intensive) or hard-setting surfaces which affect crop establishment. Establishment of small seeded crops and pastures difficult due to hard-setting and rapidly dry surface.
- Snuffy powdery surfaces can become water repellent, affecting crop establishment and growth, and are subject to wind erosion. Moderate to high or very high (red clays) erosion hazard. Minor occurrences of secondary salinity on lower slopes.

Conservation features and related management

- Habitat for rare and threatened flora and fauna.
- Remnants are threatened by weed invasion and fire on their margins.
- The use of fire breaks and cool season burns reduce this risk.
- Seasonal light grazing will reduce fuel loads.
- Remnant scrubs are used by a range of birds, reptiles and marsupials (wallabies in particular) for habitat and use the surrounding grassy woodlands or cleared paddocks as feed areas.
- Natural regeneration can be encouraged to develop connectivity with other areas of remnant vegetation.

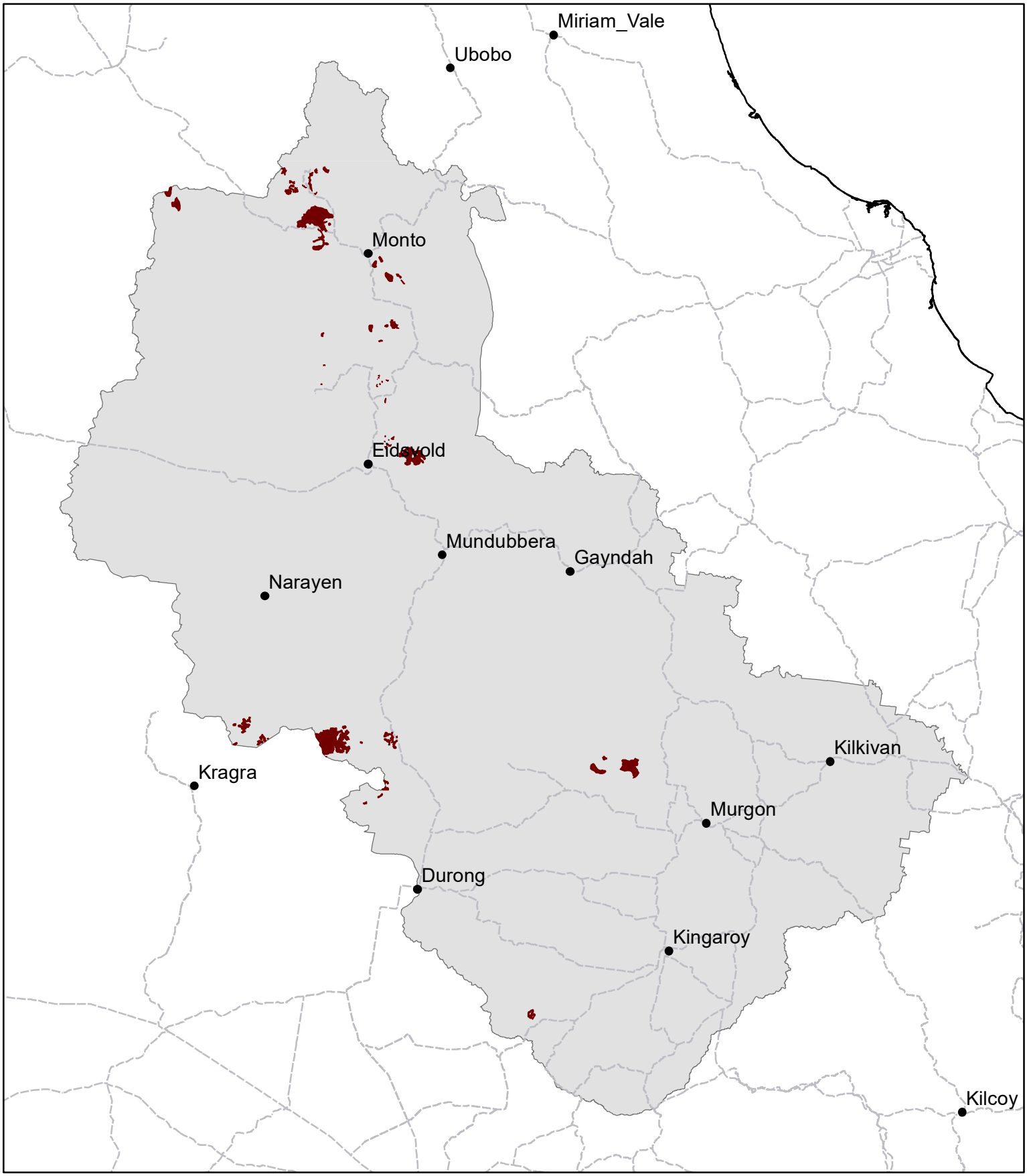
Regional Ecosystems

12.12.17.

Land resource area

Volcanic Uplands, Red Tablelands.

IB01 Bastard Scrub



Area of land type in region: 1%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 30%
Median FPC: 41%
Median TBA: 17 m2/ha

Queensland Government

Blue gum on cracking clay

Landform	Broad, low sloping floodplains on valley floors.
Woody vegetation	Tall open forest of Queensland blue gum and Moreton Bay ash with occasional broad-leaved apple, silver-leaved ironbark, rough-barked apple and broad-leaved ironbark. Understorey usually absent.
Expected pasture composition	*Southern black speargrass pastures*. ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, forest bluegrass, Queensland bluegrass, scentedtop, hairy panic.
Intermediate	Spring grass, liverseed (urochloa) grass, bamboo speargrass, umbrella grass.
Non-preferred	Wiregrasses (e.g. dark), slender chloris.
Legumes	Woolly glycine, rhynchosia, glycine pea, creeping tick trefoil.
Annual grasses	Small burr grass.
Suitable sown pastures	Creeping bluegrass, Rhodes grass, Angleton grass, leucaena, butterfly pea, Caatinga stylo, Desmanthus.
Introduced weeds	Chinese elm, broad-leaved pepper tree, cat's claw creeper.
Soil	Deep (>150 cm) dark cracking clays (black earths, vertosols), brown sandy loams (earthy sands, tenosols) and sandy clay loams (prairie, dermosols).
Description	***Surface:*** Friable, sandy; weakly self-mulching, or hard-setting; ***Surface texture:*** sandy clay loam to medium clay; ***Subsoil texture:*** sandy loam to light medium clay to medium heavy clay.
Features	Some calcium carbonate and iron/manganese nodules and segregations may be present in prairie and black earths subsoils. Surface crust forms after rain on prairie soils.
Water availability	Low (earthy sands) to moderate (prairie) to high (black earths) PAWC.
Drainage	Rapidly (earthy sands), well (prairie) and moderately (black earths) drained.
Rooting depth	Effective rooting depth >100 cm (earthy sands, prairie, black earths).

Fertility

Moderate; low nitrogen; variable (earthy sands), high (prairie), very high (black earths) phosphorus; variable (earthy sands), moderate to high potassium.

Salinity

Non-saline (earthy sands) or very low (prairie) to low (black earths) surface salinity; moderate below 80–100 cm (black earths).

Sodicity

Non-sodic at the surface; slightly sodic or sodic below 80 cm (black earths) to strongly sodic subsoils (prairie).

pH

Slightly acidic (pH 6.0) at surface; increasing to very slightly (prairie) or moderately alkaline (black earths) at depth. Neutral to alkaline throughout (earthy sands).

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 663 – 754 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	4480 - 4680	30%	2.1 – 2.2
	11 TBA 27 FPC	2350 - 3060	30%	3.2 – 4.1

Enterprise

Fattening

Land use and management recommendations

- Suitable for grazing of native and improved pastures and cropping (not if soil <45 cm).
- Use of minimum tillage and maintenance of effective ground cover (>50%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on ridges, in drainage lines and at changes of slope at base of hills to lower watertable and control salinity. Use electric fences rather than fixed fences on flood prone areas.
- Burning is recommended every 3–4 years to control regrowth (ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Prone to flooding, streambank erosion and waterlogging. Moderate to high erosion hazard.
- Low moisture availability on rapidly drained soils; poor internal drainage on lower slopes of black earth soils; and hard-setting, surface sealing clays.

Conservation features and related management

- While blue gum is common, few extensive, intact remnants remain. The large hollows often found in large, old blue gums are important nesting sites and habitat for birds and marsupials.
- Many of the freshwater wetlands in the inland Burnett are associated with this land type.
- Blue gum regenerates readily in the absence of grazing and regular fire.
- Regrowth can be encouraged by allowing remnants to expand and establish connection with other areas of remnant vegetation.
- Regrowth has hardwood potential.

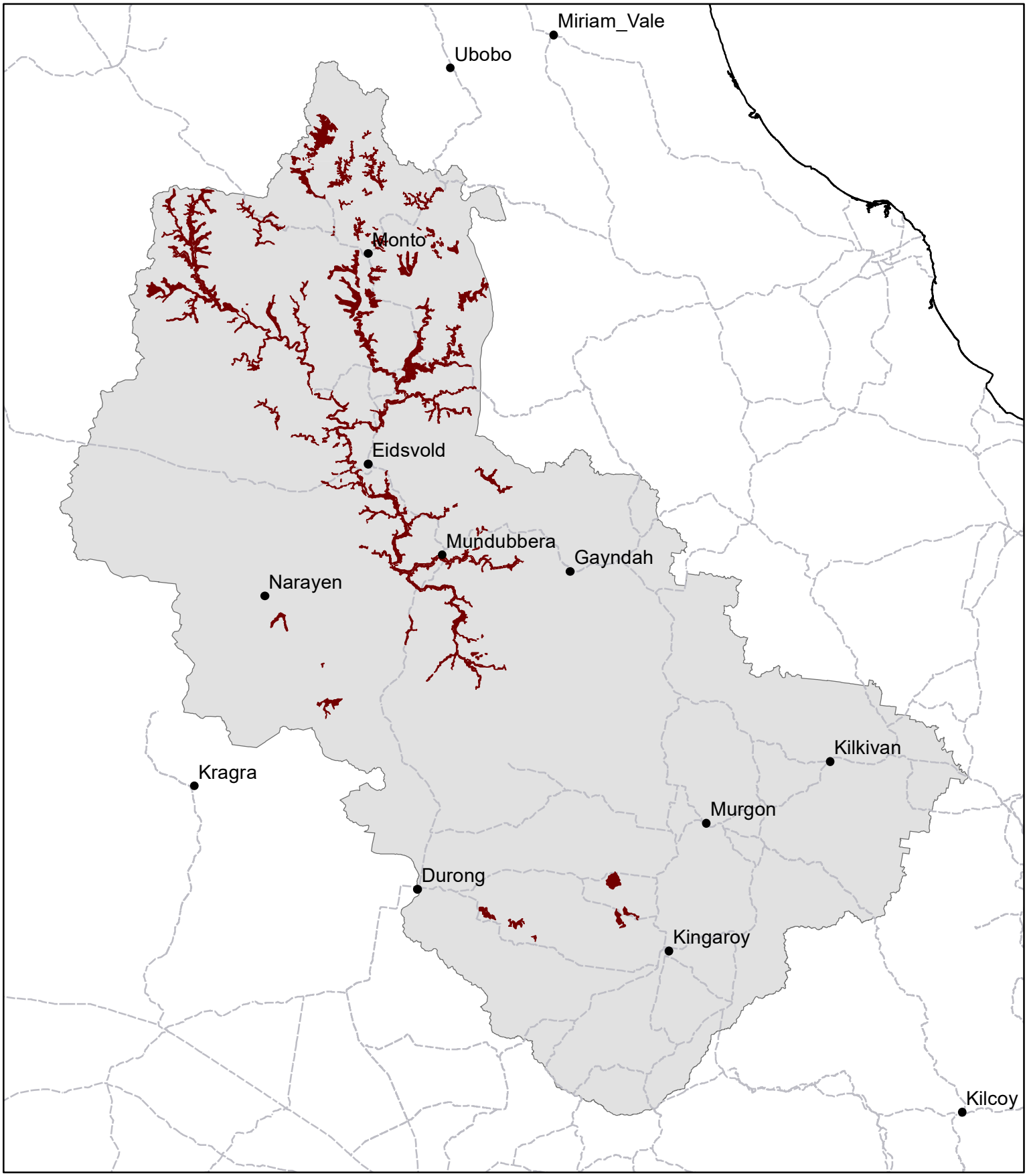
Regional Ecosystems

11.3.4, 11.3.27a-c.

Land resource area

Floodplains.

IB02 Blue gum on cracking clay



Area of land type in region: 2%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 43%
Median FPC: 27%
Median TBA: 11 m2/ha

Queensland Government

Blue gum on granite

Landform	Undulating rises to rolling hills.
Woody vegetation	Open forest to woodland of Queensland blue gum, silver-leaved ironbark and narrow-leaved ironbark. Understorey of wattle and minor beefwood.
Expected pasture composition	*Southern black speargrass pastures*. ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, red Natal grass*, silky umbrella grass, native millet.
Intermediate	Pitted bluegrass grass, bottlewasher grasses, slender chloris, barbwire grass.
Non-preferred	Golden beard grass, comet grass.
Legumes	Emu foot, glycine pea.
Suitable sown pastures	Creeping bluegrass, fine stem stylo, shrubby stylo, Wynn cassia.
Introduced weeds	Blue heliotrope.
Soil	Shallow to moderately deep texture contrast soils.
Description	***Surface:*** Hard-setting*;* ***Surface texture:*** loamy sand to sandy clay loam; ***Subsoil texture:*** sandy clay to medium clay.
Features	Stone free. Bleached subsurface layer, mottled subsoils.
Water availability	Low (yellow) to high (red) PAWC.
Drainage	Poorly drained (yellow) to moderately drained (red).
Rooting depth	Effective rooting depth 20 cm (yellow) to 60 cm (red).
Fertility	Low; low to moderate nitrogen, very low phosphorus, low to moderate to high potassium.

Salinity

Low to non-saline.

Sodicity

Non-sodic (red), strongly sodic below 50 cm (yellow).

pH

Alkaline soil reaction trend, slightly acidic at surface, increasing alkalinity (pH 6.0–7.5) upper subsoils and moderately alkaline (7.8–8.6) in lower subsoils.

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 694 – 785 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	4760 - 5010	30%	1.9 - 2.0
	12 TBA 30 FPC	2040 - 2730	30%	3.6 – 4.8

Enterprise

Breeding and stores.

Land use and management recommendations

- Suitable for grazing of native and improved pastures, short-term cropping only on red soils.
- Maintenance of effective ground cover (>50%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on stony ridges and at changes of slope at base of hills to control erosion (particularly tunnel erosion).
- Burning is recommended every 2-3 years to control regrowth (blue gum, ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Shallow effective rooting depth and poor internal drainage (yellow).
- Low fertility.
- Low PAWC will restrict dryland crop growth.
- Hard-setting surface affects infiltration and cultivation.
- Small seeded crops and pasture difficult to establish due to rapid drying and sealing of sandy surface.
- Moderate erosion hazard on low to moderate slopes (red).
- Very high erosion hazard and particularly prone to tunnel erosion (yellow).

Conservation features and related management

- Extensively cleared for native pasture in some areas; relatively intact in others.
- These are generally grassy woodlands that provide habitat for larger marsupials.
- Hollow-bearing habitat trees are important nesting sites for birds and arboreal mammals.
- Landscape health can be enhanced through appropriate fire regimes, grazing management an allowing regrowth to develop into effective wildlife corridors.

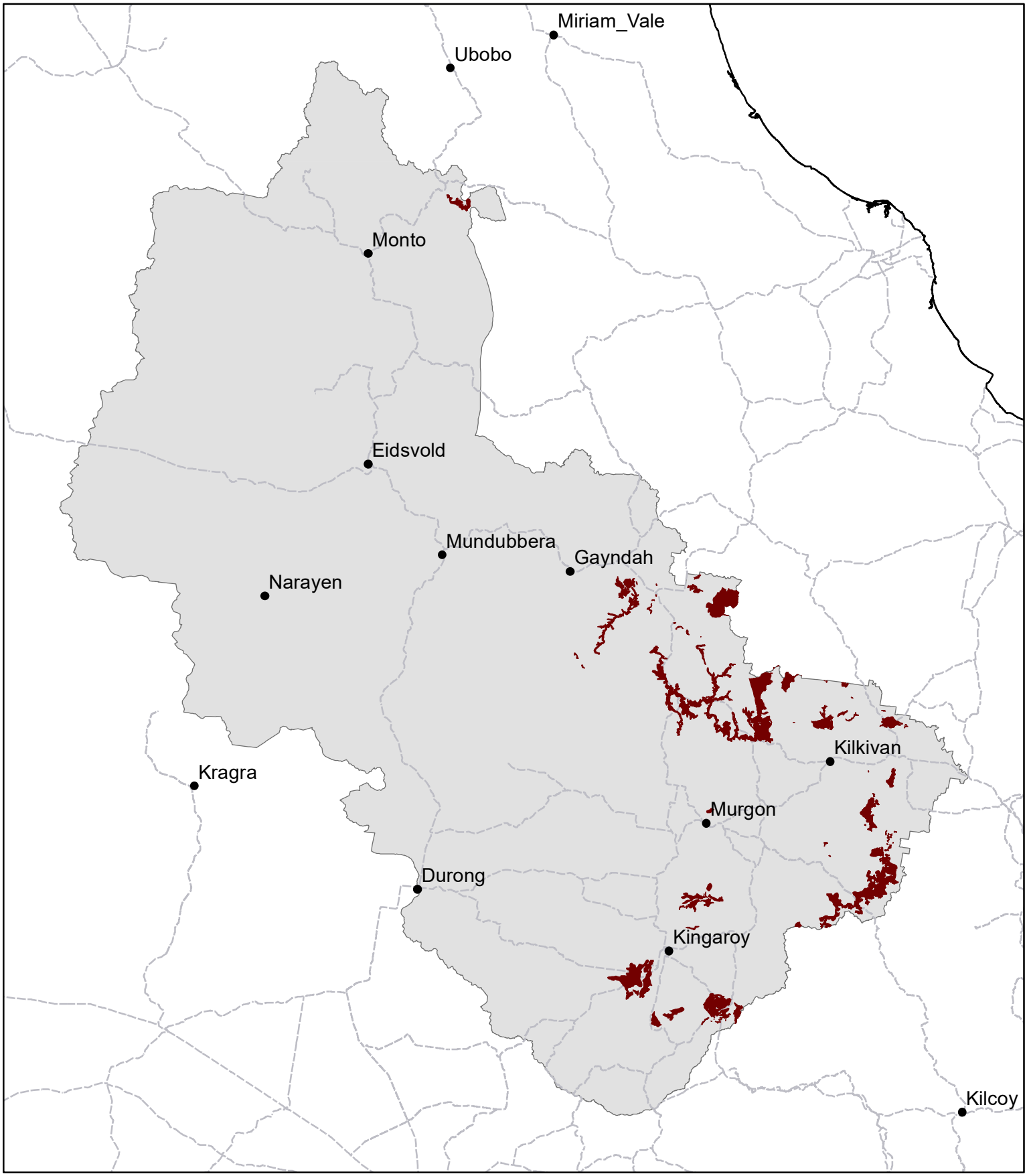
Regional Ecosystems

12.12.23, 12.12.12.

Land resource area

Granite Hills.

IB03 Blue gum on granite



Area of land type in region: 2%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 37%
Median FPC: 30%
Median TBA: 12 m2/ha

Queensland Government

Blue gum on loam and duplex

Landform	Levees and levee backslopes along major streams and rivers, and the upper slopes of gently undulating relict alluvial plains and high terraces.
Woody vegetation	Tall open forest to woodland of Queensland blue gum and Moreton Bay ash or Queensland blue gum and rough-barked apple with occasional silver-leaved ironbark and narrow-leaved ironbark. Understorey usually absent.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, Queensland bluegrass, kangaroo grass, hooky grass, leafy panic.
Intermediate	Slender chloris, slender rat's tail grass.
Non-preferred	Wiregrasses (e.g. dark), purple lovegrass, reedgrass.
Legumes	Woolly glycine, glycine pea.
Suitable sown pastures	Rhodes grass, creeping bluegrass, digit grass, tall finger grass, shrubby stylo, Wynn cassia.
Introduced weeds	Chinese elm, broad-leaved pepper tree, cat's claw creeper.
Soil	Deep brown sandy loam (earthy sands) and clay loams (prairie), and brown texture contrast soils (solodics).
Description	***Surface:*** Hard-setting and crusting, some friable and sandy; ***Surface texture:*** sandy clay loam; ***Subsoil texture:*** light medium to medium clay.
Features	Hard-setting and crusting surfaces. Some soils may be impeded by buried clay layers.
Water availability	Low to moderate PAWC.
Drainage	Imperfect (solodic) to well (prairie) and rapidly (earthy sand) drained.
Rooting depth	Effective rooting depth <35 cm (solodic) to >100 cm (earthy sand, prairie).

Fertility

Medium. Low nitrogen; very low to high phosphorus; very low to high potassium.

Salinity

Non-saline, moderate salinity below 50 cm (solodic).

Sodicity

Sodic to strongly sodic below 70 cm.

pH

Acid surface (pH 6.0–6.5) to neutral; neutral to slightly alkaline (7.0–7.5, prairie) to moderately alkaline (earthy sand) to strongly alkaline (9.0–9.5, solodic) in subsoils.

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 629 – 754 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	2330 - 2520	30%	3.9 – 4.2
	9 TBA 23 FPC	1350 - 1800	30%	5.4 – 7.2

Enterprise

Breeding and fattening.

Land use and management recommendations

- Suitable for grazing of native and improved pastures and cropping.
- Use of minimum tillage and maintenance of effective ground cover (>70%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber in drainage lines and at changes of slope at base of hills to lower watertable and control salinity.
- Burning is recommended every 3–4 years to control regrowth (ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Shallow effective rooting depth due to impermeable and saline subsoils.
- Hard-setting surface affects ease of cultivation.
- Low fertility and low to moderate PAWC will restrict dryland plant growth.
- Surface sealing and structure breakdown can occur when cultivated.
- Moderate to high erodibility, but moderate erosion hazard due to low slopes.

Conservation features and related management

- The large hollows often found in old blue gums are important nesting sites and habitat for birds and marsupials. Prone to invasions by weeds such as Chinese elm, broad-leaved pepper tree and cat's claw creeper.
- Blue gum regenerates readily in the absence of grazing and regular fire.
- Regrowth can be encouraged to allow remnants to expand and establish connection with other areas of remnant vegetation.
- Regrowth has hardwood potential.
- Many freshwater wetlands in the Burnett are associated with this land type.

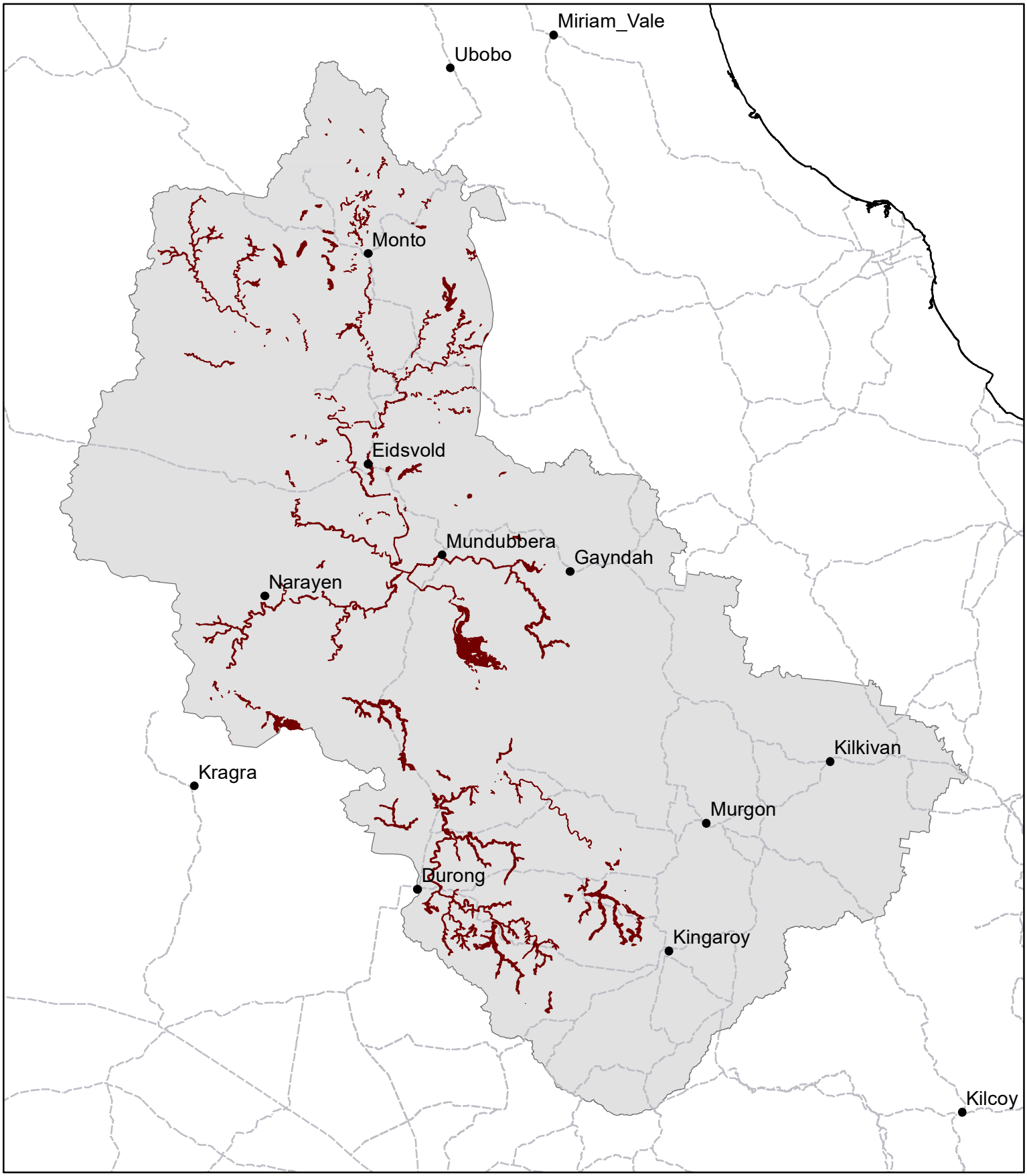
Regional Ecosystems

11.5.17.

Land resource area

Floodplains, Terraces.

IB04 Blue gum on loam and duplex



Area of land type in region: 2%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 62%
Median FPC: 23%
Median TBA: 9 m2/ha

Queensland Government

Box on clay

Landform	Backplains and levee backslopes of alluvial plains and creek flats.
Woody vegetation	Tall open woodland to open forest of poplar box, gum-topped box, broad-leaved apple. Understorey often absent.
Expected pasture composition	*Southern black speargrass pastures*. ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, forest bluegrass, Queensland bluegrass, scentedtop, paspalum*.
Intermediate	Pitted bluegrass, barbwire grass.
Non-preferred	Wiregrasses (e.g. dark).
Legumes	Woolly glycine, rhynchosia, glycine pea.
Annual grasses	Small burr grass.
Suitable sown pastures	Creeping bluegrass, Rhodes grass, Angleton grass, Bambatsi panic, leucaena, butterfly pea, Caatinga stylo, Desmanthus.
Introduced weeds	
Soil	Deep (>150 cm) dark grey or brown cracking clays (black earths).
Description	***Surface:*** Self-mulching; ***Surface texture:*** medium clay; ***Subsoil texture:*** medium heavy clay.
Features	Some small quantities of calcium carbonate and iron/manganese nodules and segregations.
Water availability	High PAWC.
Drainage	Moderate

Rooting depth

Effective rooting depth >100 cm.

Fertility

Low to moderate; low nitrogen; variable phosphorus; moderate potassium.

Salinity

Low below 80 cm.

Sodicity

Slightly sodic below 80 cm.

pH

Slightly acidic to neutral at surface; increasing to moderately alkaline at depth.

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 631 – 707 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	3990 - 4190	30%	2.3 – 2.4
	10 TBA 26 FPC	2700 - 2740	30%	3.6

Enterprise

Breeding and fattening.

Land use and management recommendations

- Suitable for grazing of native and improved pastures and cropping.
- Use of minimum tillage and maintenance of effective ground cover (>50%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber in drainage lines and at changes of slope at base of hills to lower watertable and control salinity.
- Avoid trafficking when wet to reduce soil compaction.
- Burning is recommended every 2–3 years to control regrowth (poplar box, currant bush, false sandalwood) and to enhance preferred pasture species.

Land use limitations

- Subject to periodic flooding and waterlogging.
- Imperfect internal drainage on low slopes and moderate erosion hazard.
- Low fertility except for potassium.

Conservation features and related management

- Large poplar box trees often have hollows that are home to arboreal marsupials and provide nest sites for a wide range of birds such as owlet nightjars, owls and parrots.
- Generally, the good grass cover provides shelter and food for ground dwelling animals such as wallabies and rufous bettongs.

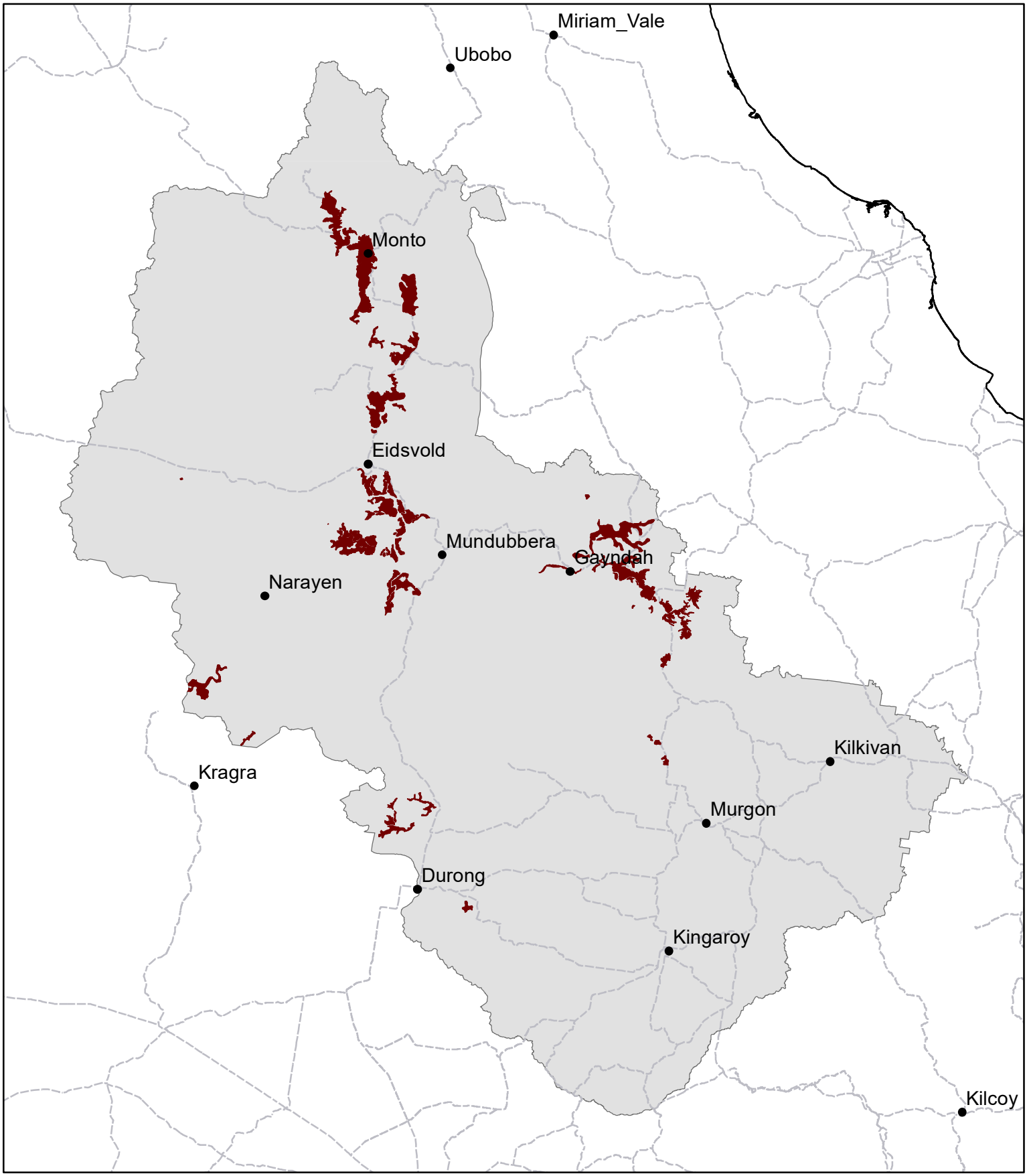
Regional Ecosystems

12.3.10.

Land resource area

Floodplains.

IB05 Box on clay



Area of land type in region: 2%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 23%
Median FPC: 26%
Median TBA: 10 m2/ha

Queensland Government

Box on erosive soils

Landform	Broad low sloping, higher lying relict alluvial plains.
Woody vegetation	Open forest or woodland of poplar box, narrow-leaved ironbark, gum-topped box and occasionally rusty gum. Understorey usually absent, occasionally wilga and wattles.
Expected pasture composition	*Wiregrass – pitted bluegrass pastures*. ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, forest bluegrass, Queensland bluegrass, scentedtop.
Intermediate	Spider grass, bottlewasher grasses, silky umbrella grass.
Non-preferred	Wiregrasses (e.g. dark), slender chloris.
Legumes	Woolly glycine, rhynchosia, emu foot, creeping tick trefoil.
Annual grasses	Small burr grass.
Suitable sown pastures	Creeping bluegrass, Rhodes grass, shrubby stylo.
Introduced weeds	
Soil	Yellow sandy texture contrast soils.
Description	***Surface:*** Hard-setting*;* ***Surface texture:*** sandy loam to loamy sand; ***Subsoil texture:*** sandy clay to medium clay.
Features	Erosive, saline and sodic soils. Bleached A2 horizon. Some quartz gravel in surface.
Water availability	Low PAWC.
Drainage	Poorly drained.
Rooting depth	Effective rooting depth 20 cm.
Fertility	Low; low nitrogen, very low phosphorus, moderate to high potassium.
Salinity	Moderate to high salinity below 20 cm.

Sodicity

Strongly sodic subsoils.

pH

Alkaline (pH 8.0) to neutral soil reaction trend.

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 631 – 676 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	2860 - 2980	25%	3.9 – 4.1
	10 TBA 24 FPC	1410 - 1420	25%	8.2 – 8.3

Enterprise

Breeding and stores.

Land use and management recommendations

- Suitable for grazing of native and improved pastures.
- Maintenance of effective ground cover (>70%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber in drainage lines and at changes of slope at base of hills to lower watertable and control salinity.
- Burning is recommended every 4–6 years to control regrowth (box, false sandalwood, currant bush) and to enhance preferred pasture species.

Land use limitations

- Land subject to flooding and periodic waterlogging.
- Low PAWC will restrict dryland crop growth. When cultivated surface sealing develops after rain, affecting crop establishment.
- Narrow moisture range for successful cultivation.
- Low fertility (except for potassium).
- Root development affected by impermeable and saline subsoils.
- High to extreme erosion hazard and prone to scalding.

Conservation features and related management

- Generally the good grass cover provides shelter and food for ground dwelling animals such as spectacled hare-wallabies and rufous bettongs.
- Large poplar box trees often have hollows that are home to arboreal marsupials and provide nest sites for a wide range of birds such as owlet nightjars, owls and parrots.
- Patch burning of these woodlands in the late winter months is preferable. Where grazed paddock areas need to be burnt to prevent excessive grazing pressure on new growth, with some burning prior to summer rains.
- Mature trees can easily be burnt through at the base and therefore frequent burning can lead to loss of these important habitat trees.
- Trees are important in the cycling of nutrients from deeper in the soil profile.
- Due to the potential erosion hazard of these duplex soils good ground cover should be retained on slopes and drainage lines.

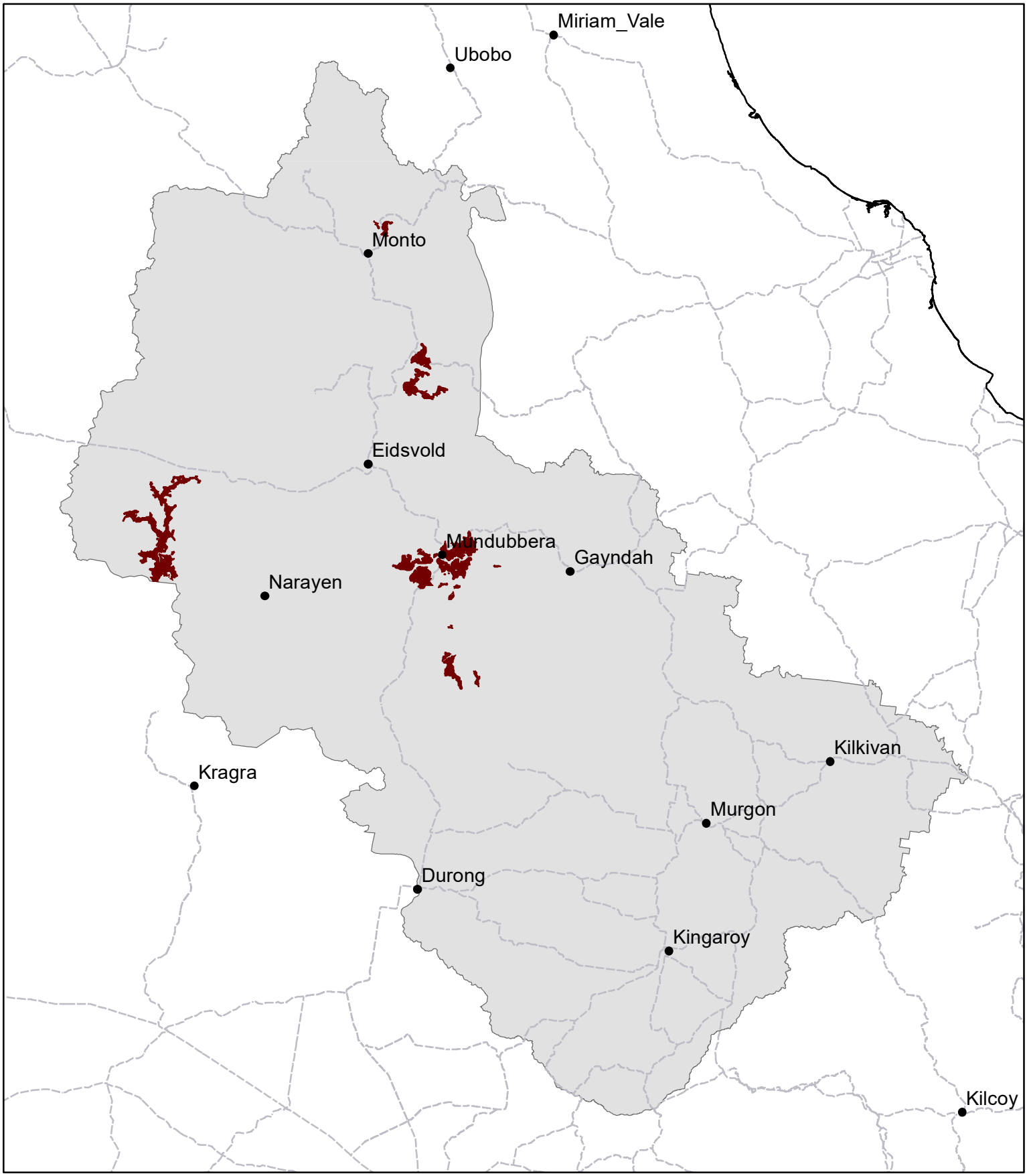
Regional Ecosystems

11.5.13, 11.9.7, 11.11.9.

Land resource area

Terraces.

IB06 Box on erosive soils



Area of land type in region: 1%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 29%
Median FPC: 24%
Median TBA: 10 m2/ha

Queensland Government

Brigalow and brigalow belah

Landform	Gently undulating relict alluvial plains and higher lying level plains, and most slope positions on undulating low rises (slopes 1% to 4%).
Woody vegetation	Brigalow and brigalow belah open forest in association with wattles, wilga and softwood scrub.
Expected pasture composition	Brigalow pastures. ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Brigalow grass, Queensland bluegrass, hooky grass, leafy panic.
Intermediate	Slender chloris, slender rat's tail grass.
Non-preferred	Dark wiregrass, purple lovegrass.
Legumes	Woolly glycine, glycine pea.
Suitable sown pastures	Green panic, Gatton panic, creeping bluegrass, Angleton grass, Rhodes grass, buffel grass, Caatinga stylo, butterfly pea, siratro, leucaena, Desmanthus.
Introduced weeds	
Soil	Brown and grey clays generally deep (>100–150 cm).
Description	***Surface:*** Hard-setting to self-mulching; ***Surface texture:*** light medium to medium clay; ***Subsoil texture:*** medium to heavy clay.
Features	Weak gilgai may occur. Some quartz gravel but mostly stone free.
Water availability	Moderate PAWC (brown clays) to high PAWC (grey clays).
Drainage	Imperfect (grey clays) to moderately drained (brown clays).
Rooting depth	Effective rooting depth 60 cm (grey clays), >100 cm (brown clays).
Fertility	Moderate to high; low to high nitrogen, low phosphorus, high to very high potassium.
Salinity	Very low throughout profile (brown clays); moderate to high below 50 cm (grey clays).

Sodicity

Sodic (below 60 cm brown clays) to strongly sodic (below 20 cm grey clays).

pH

Alkaline at surface (pH 7.5–8.0); strongly alkaline below 60 cm (9.0–9.5).

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 629 – 726 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	5380 - 6110	30%	1.6 – 2.1
	13 TBA 32 FPC	3170 - 3770	30%	2.6 – 2.1

Enterprise

Breeding herds, fattening.

Land use and management recommendations

- Suitable for mixed farming cropping (forage and grain).
- Suitable for grazing of native and improved pastures (grey clays) and for most field and forage crops (brown clays).
- Use of runoff control structures (contour banks, waterways); use minimum tillage and maintenance of effective ground cover (>50%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of sheet, rill and wind erosion.
- Control regrowth if limiting pasture growth by burning every 3–5 years.
- Retain timber in ridges and at changes of slope at base of hills to lower the watertable and control salinity.

Land use limitations

- Shallow effective rooting depth due to impermeable and saline subsoils.
- Hard-setting surfaces affect workability.
- Sodic subsoils impede internal drainage and restrict crop root development.
- Minor occurrences of salinity in drainage lines. Narrow moisture range for successful cultivation.
- Moderate to high risk of erosion; high risk of gully erosion where water is concentrated.
- Control regrowth if limiting pasture growth by burning >6 years.

Conservation features and related management

- Extensively cleared for pasture and cropping.
- Only very small areas remain and these are used by 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.
- Remnants are threatened by weed invasion and fire on their margins.
- The use of fire breaks and cool season burns reduce this risk.
- The ideal scenario for conservation would be to fence these unique areas off from grazing.

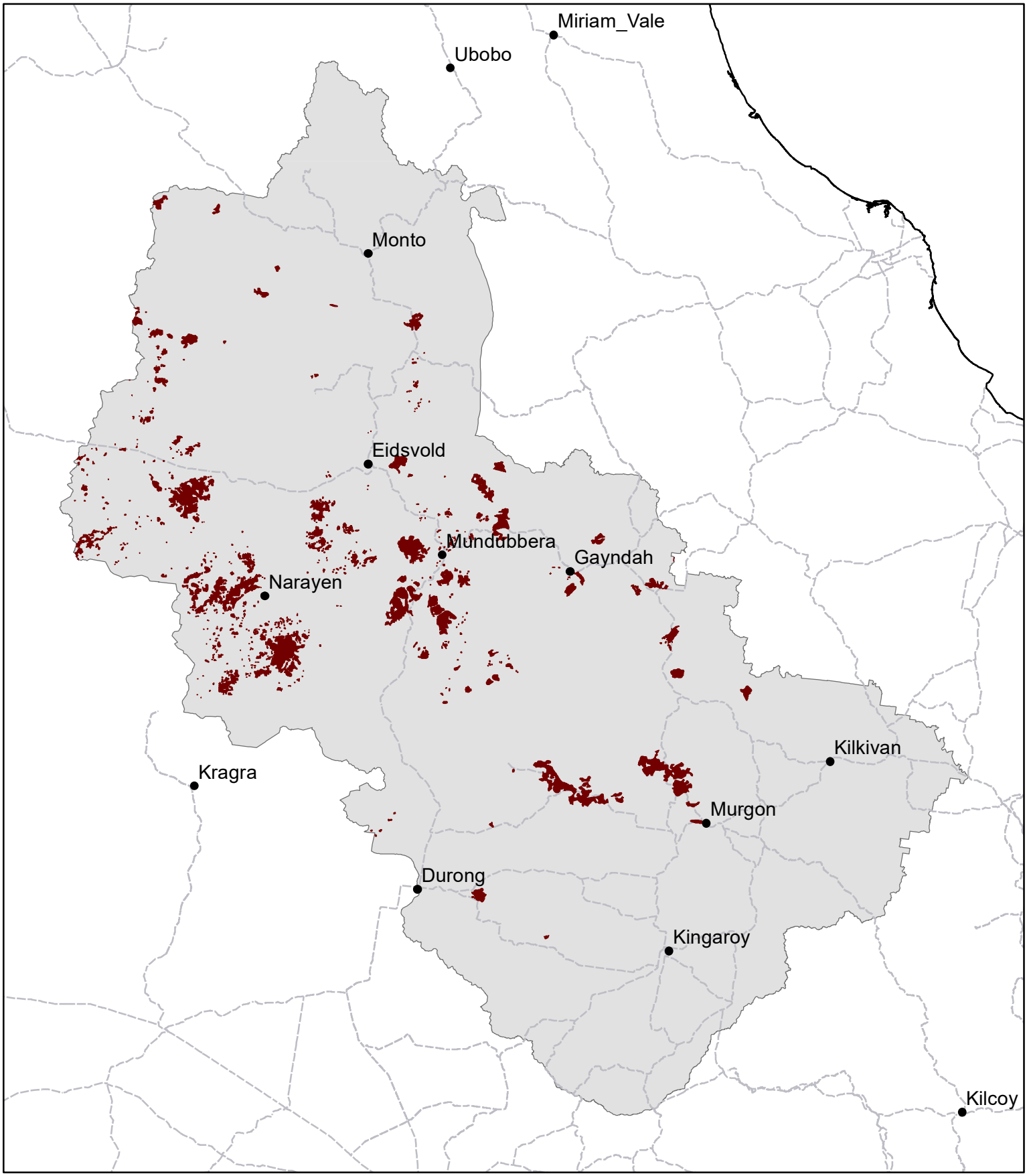
Regional Ecosystems

12.8.23, 12.12.26, 12.12.26a.

Land resource area

Undulating Plains; Relict Alluvial Plains.

IB07 Brigalow and brigalow belah



Area of land type in region: 2%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 18%
Median FPC: 32%
Median TBA: 13 m2/ha

Queensland Government

Brigalow with melonholes

Landform	Higher lying level plains, and mid slopes and crests of broad low rises.
Woody vegetation	Brigalow, black tea tree belah open forest.
Expected pasture composition	*Brigalow pastures*. ** Denotes non-native "Expected Pasture Composition" species*.
Preferred	Brigalow grass, Queensland bluegrass, silky browntop.
Intermediate	Native millet, spring grass, umbrella canegrass, slender chloris.
Non-preferred	Wiregrasses (e.g. dark), tall chloris.
Legumes	Woolly glycine, rhynchosia.
Suitable sown pastures	Creeping blue grass, Rhodes grass, green panic, buffel grass, Angleton grass, Bambatsi panic, Caatinga stylo, Desmanthus.
Introduced weeds	
Soil	Generally deep (>150 cm) brown and grey medium to heavy clays, weakly to strongly gilgaied.
Description	***Surface:*** Self-mulching and cracking; ***Surface texture:*** light to medium heavy clay; ***Subsoil texture:*** medium heavy to heavy clay.
Features	Variable gilgai microrelief.
Water availability	Moderate to high PAWC.
Drainage	Poor
Rooting depth	Effective rooting depth 40–60 cm.
Fertility	Moderate to high; moderate to high nitrogen, low to moderate phosphorus, high potassium.

Salinity

Highly saline below 50–60 cm on mounds; moderate in depressions.

Sodicity

Non-sodic at the surface. Sodic to strongly sodic below 30–50 cm.

pH

Slightly to moderately alkaline (pH 7.0–8.0) at surface; increasing alkalinity at depth (pH 9.0).

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 629 – 707 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	4630 - 4710	30%	2.1
	11 TBA 27 FPC	3040 - 3080	30%	3.2

Enterprise

Fattening

Land use and management recommendations

- Suitable for grazing of native and improved pastures, some short term only cropping.
- Use of minimum tillage and maintenance of effective ground cover (>50%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on ridges, in drainage lines and at changes of slope at base of hills to lower watertable and control salinity.
- Burning is recommended not more frequently than every 6 years to control regrowth (brigalow, black tea tree) and to enhance preferred pasture species.

Land use limitations

- Waterlogging, uneven wetness, restricted trafficability and tillage caused by gilgai microrelief. Narrow moisture range for successful cultivation.
- Sodic subsoil impedes internal drainage and restricts crop development.
- Possibility of salinity outbreaks in drainage lines.
- Low erosion hazard due to moderate erodibility and moderate slopes.

Conservation features and related management

- As there are very few areas of this land type remaining 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.
- Brigalow melonholes can be prolific breeding sites for frogs and are an attractant for species such as the vulnerable ornamental snake 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.

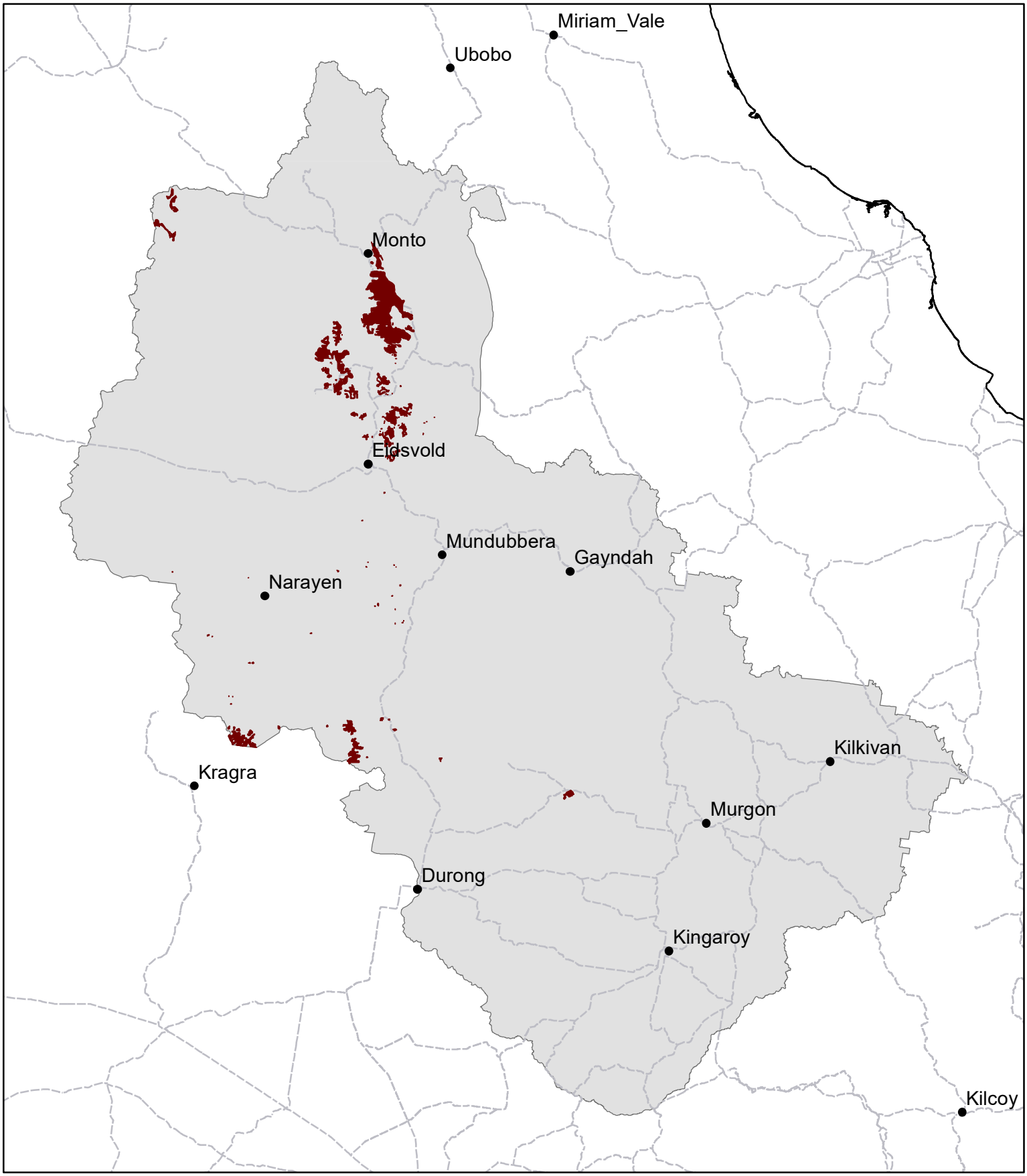
Regional Ecosystems

11.9.5.

Land resource area

Relict Alluvial Plains.

IB08 Brigalow with melonholes



Area of land type in region: 1%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 10%
Median FPC: 27%
Median TBA: 11 m2/ha

Queensland Government

Gum-topped box

Landform	Slightly elevated level to gently undulating relict floodplains, backplains and slightly higher terraces of major streams.
Woody vegetation	Open forest to woodland of gum-topped box, narrow-leaved ironbark and poplar box, with scattered rusty gum and Queensland blue gum. Occasional understorey of wattles, myrtle tree and beefwood.
Expected pasture composition	*Wiregrass – pitted bluegrass pastures*. ** Denotes non-native "Expected Pasture Composition" species*.
Preferred	Black speargrass, forest bluegrass, barbwire grass, kangaroo grass, pitted bluegrass grass.
Intermediate	Spider grass (native couch), bottlewasher grasses, umbrella grass.
Non-preferred	Wiregrasses (e.g. dark), slender chloris.
Legumes	Woolly glycine, emu foot, creeping tick trefoil.
Annual grasses	Small burr grass.
Suitable sown pastures	None suitable.
Introduced weeds	
Soil	Moderately deep (120 cm) yellow, grey or brown texture contrast soils (solodics).
Description	***Surface:*** Hard-setting*;* ***Surface texture:*** sandy loam to clay loam; ***Subsoil texture:*** sandy clay to medium to heavy clay.
Features	Some surface quartz gravel, generally stone free. Small amounts of calcium carbonate and iron/manganese nodules in subsoils.
Water availability	Low to moderate PAWC.
Drainage	Poorly drained subsoils.
Rooting depth	Effective rooting depth 15–20 cm.
Fertility	Low; low nitrogen, very low to moderate phosphorus, low to high potassium.

Salinity

Moderate to high salinity below 20 cm.

Sodicity

Sodic to strongly sodic subsoils.

pH

Acid (pH 6.5) to alkaline (pH 8.5–9.0) soil reaction trend (solodics).

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 663 – 754 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	3820 - 4500	25%	2.6 - 3.1
	10 TBA 25 FPC	1620 - 2820	25%	4.2 – 7.2

Enterprise

Breeding

Land use and management recommendations

- Suitable for grazing of native and improved pastures.
- Maintenance of effective ground cover (>50%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Do not cultivate if surface soil is less than 45 cm deep.
- Retain timber in drainage lines and at changes of slope at base of hills to control erosion.
- Burning is recommended every 2–3 years to control regrowth (gum-topped box, ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Subject to periodic flooding and waterlogging.
- Shallow effective rooting depth often due to impermeable and saline subsoils.
- Soil salinity and or sodicity may affect plant growth.
- When cultivated, surface sealing occurs after rain affecting crop establishment.
- Hard setting surface affects infiltration and cultivation.
- High erosion hazard, particularly prone to scalding and gully erosion.

Conservation features and related management

- Remnant woodlands are important habitat for gliders, possums, koalas, tree creepers, speckled warblers, powerful owls and ground foraging birds.
- These woodlands provide important corridors through the landscape for both resident and dispersing fauna.
- Frequent fires reduce the shrubby understorey, but variable fire regimes encourage mosaics.
- Heavy grazing reduces fuel loads and exposes the soil surface to erosion.

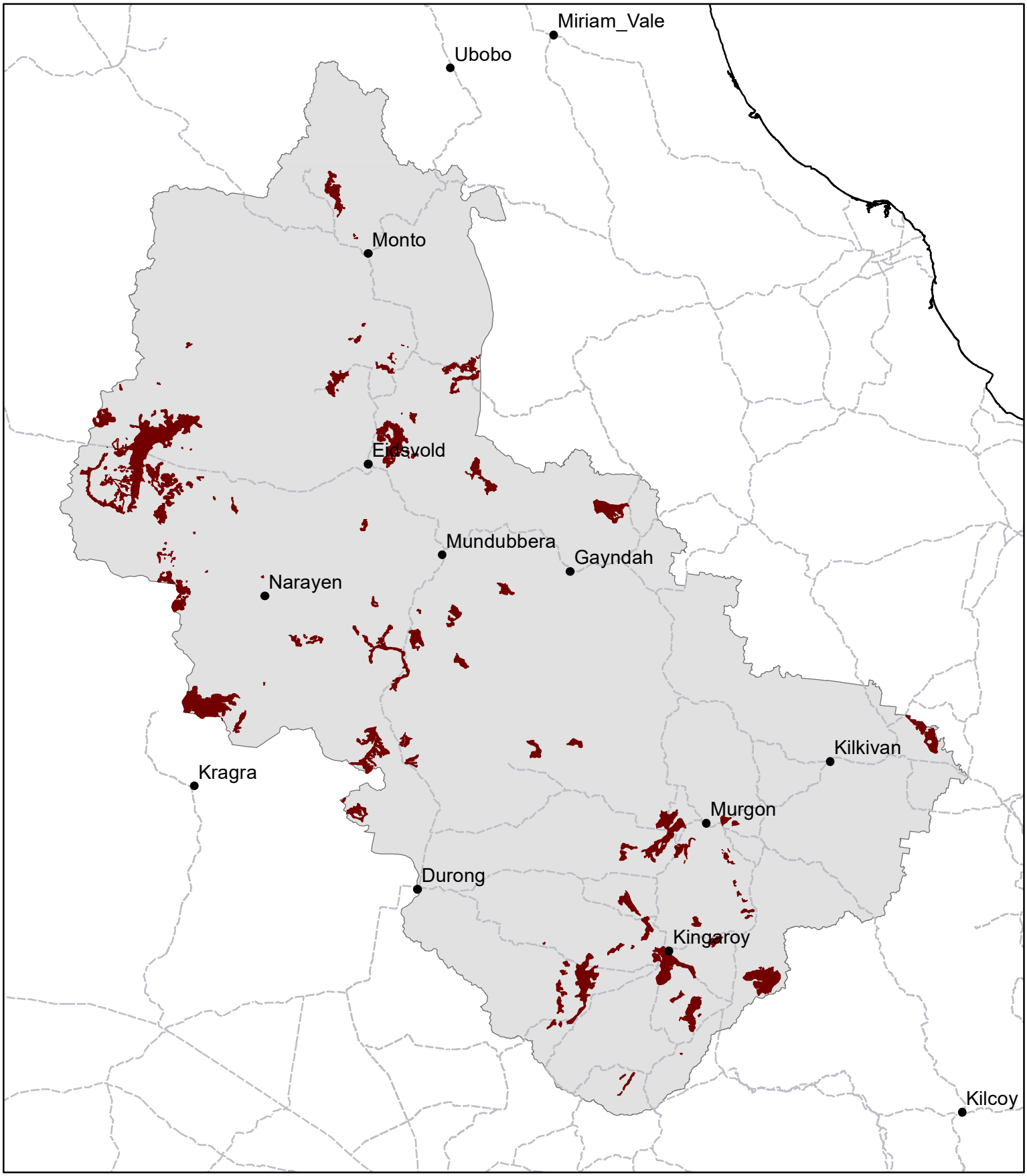
Regional Ecosystems

11.5.20, 11.9.13, 11.11.10a, 11.12.2b, 12.8.14a, 12.9-10.3.

Land resource area

Terraces and Relict Alluvial Plains.

IB09 Gum-topped box



Area of land type in region: 3%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 52%
Median FPC: 25%
Median TBA: 10 m2/ha

Queensland Government

Ironbark and bloodwood on non-cracking clay

Landform	Undulating rises and mid to lower slopes of low hills and ranges.
Woody vegetation	Woodlands of silver-leaved and narrow-leaved ironbarks and variable-barked bloodwood with occasional Queensland blue gum and areas of softwood scrub. Understorey usually absent.
Expected pasture composition	*Southern black speargrass pasture*. ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, forest bluegrass, Queensland bluegrass, scentedtop, paspalum*.
Intermediate	Pitted bluegrass, Indian couch*, barbwire grass, silkyheads.
Non-preferred	Wiregrasses (dark, erect kerosene), slender chloris, woodland lovegrass.
Legumes	Woolly glycine, rhynchosia, emu foot, creeping tick trefoil.
Suitable sown pastures	Creeping bluegrass, Rhodes grass, Gatton panic, Caatinga stylo, Desmanthus.
Introduced weeds	Creeping lantana.
Soil	Dark, brown and red non-cracking clays.
Description	***Surface:*** Hard-setting to weakly self-mulching; ***Surface texture:*** light clay; ***Subsoil texture:*** medium heavy clay.
Features	Weathered bedrock at depths of 65 cm (prairie). Small amounts of cobble but generally stone free.
Water availability	Low to moderate PAWC.
Drainage	Moderate
Rooting depth	Effective rooting depth variable 60–90 cm.
Fertility	Moderate to high; low to moderate nitrogen, very low to low phosphorus, moderate to high potassium.

Salinity

Very low (prairie) to moderate below 70 cm (non-cracking red clays).

Sodicity

Non-sodic (prairie). Sodic below 25 cm to strongly sodic below 70 cm (red non-cracking).

pH

Neutral soil reaction trend (pH 6.5–7.5, prairie); alkaline soil reaction trend (pH 8.5–9.0 red non-cracking subsoils).

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 629 – 754 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	3430 - 3810	30%	2.6 – 2.8
	9 TBA 23 FPC	2020 - 2460	30%	4.0 – 4.8

Enterprise

Breeding and fattening.

Land use and management recommendations

- Suitable for grazing of native and improved pastures and short term only cropping.
- Use of minimum tillage and maintenance of effective ground cover (>50%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on ridges, in drainage lines and at changes of slope at base of hills to lower watertable and control salinity.
- Burning is recommended every 2–3 years to control regrowth (ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Cloddy surface, PAWC and rockiness may restrict cultivation and crop establishment.
- Cultivation can cause surface crusting which affects crop establishment.
- Shallow effective rooting depth due to adverse subsoils conditions or rock.
- High to very high erosion hazard, particularly prone to gully erosion where water is concentrated.

Conservation features and related management

- This woodland is an important wildlife habitat. Mature stands with numerous tree hollows are home to possums, koalas and gliders. The rough fissured bark of the ironbarks is ideal habitat for skinks and geckoes.
- The grassy understorey provides habitat for ground fauna such as small marsupials (betongs), reptiles (frilled-neck lizards) and birds (quail) and is an important food source for the large macropods (whip-tailed wallabies, eastern grey kangaroos).
- While large areas of this land type have been thinned for grazing, reasonably sized remnants remain.
- The health of the landscape can be enhanced through appropriate fire regimes, grazing management an allowing regrowth to develop into effective wildlife corridors.

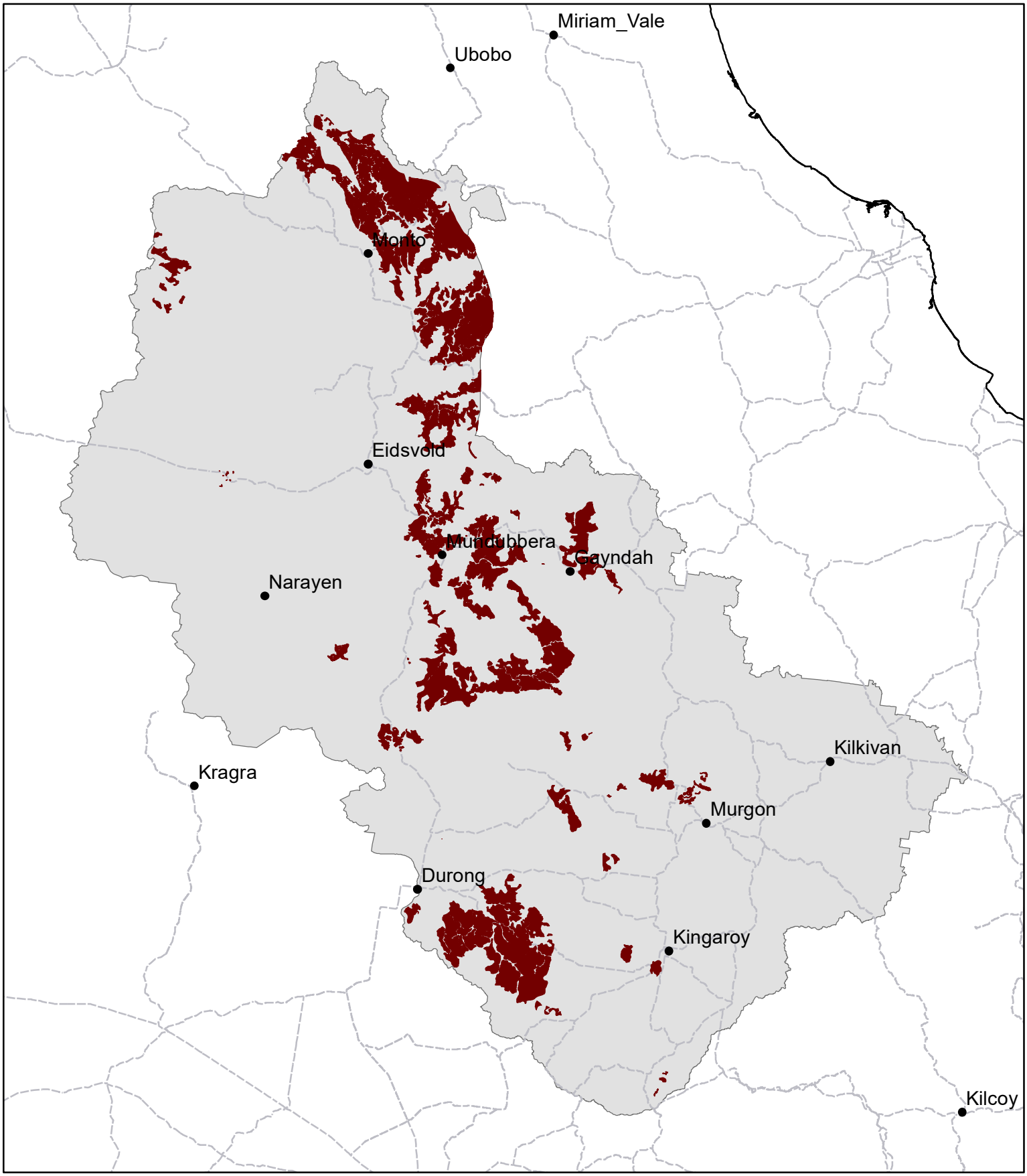
Regional Ecosystems

11.11.4, 11.12.3, 12.9-10.8.

Land resource area

Volcanic Uplands.

IB10 Ironbark and bloodwood on non-cracking clay



Area of land type in region: 8%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 63%
Median FPC: 23%
Median TBA: 9 m2/ha

Queensland Government

Ironbark and spotted gum on duplex and loam

Landform	Gently to moderately inclined, undulating plains to slopes and rises of low hills (slopes 3–12%), with areas of steep hills (up to 40%).
Woody vegetation	Woodland to open forest of narrow-leaved ironbark and spotted gum, occasionally bloodwood, with an understorey of wattle and whitewood.
Expected pasture composition	*Southern black speargrass pastures*. ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, forest bluegrass, Queensland bluegrass, scentedtop, paspalum*.
Intermediate	Pitted bluegrass, Indian couch*, barbwire grass, silkyheads.
Non-preferred	Wiregrasses (e.g. dark, erect kerosene), woodland lovegrass, slender chloris.
Legumes	Woolly glycine, emu foot, creeping tick trefoil, rhynchosia.
Suitable sown pastures	Rhodes grass, creeping bluegrass, shrubby stylo.
Introduced weeds	
Soil	Shallow (50 cm) to moderately deep (<120 cm) texture contrast soils and shallow sandy and loamy soils. Some areas of dark clay soils, and red and yellow earths and deep sands (sandstone and siltstone).
Description	***Surface:*** Hard-setting*;* ***Surface texture:*** sandy loam to clay loam; ***Subsoil texture:*** medium to medium heavy clay.
Features	Bleached or partially bleached subsurface layers. Mottling of subsoils. Stone free.
Water availability	Low PAWC.
Drainage	Poorly or imperfectly drained subsoils.
Rooting depth	Effective rooting depth 35–40 cm.

Fertility

Low to moderate; low nitrogen, very low to low phosphorus, moderate to very high potassium.

Salinity

Very low (soloths); moderate to high below 60 cm (solodics).

Sodicity

Sodic subsoils (soloths); sodic (35 cm) to strongly sodic (below 50 cm) (solodics).

pH

Acid soil reaction trend, occasionally neutral (soloths), Alkaline to neutral soil reaction trend (solodics).

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 663 – 754 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	4840 - 5100	30%	1.9 – 2.0
	11 TBA 27 FPC	2180 - 2970	30%	3.3 – 4.5

Enterprise

Breeding and fattening.

Land use and management recommendations

- Suitable for grazing of native and improved pastures.
- Maintenance of effective ground cover (>50%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on ridges and at changes of slope at base of hills to control erosion.
- Burning is recommended every 2–3 years to control regrowth (spotted gum, ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Shallow effective rooting depth, low fertility, low PAWC restricts dryland crop growth.
- Small seeded pasture difficult to establish due to rapid drying and sealing of sandy surface.
- Very high erosion hazard, particularly prone to scalding, gully and tunnel erosion.

Conservation features and related management

- Habitat for rare flora (*Persoonia* spp. and cycads) and provide valuable resources for forest dependent fauna such as possums, gliders, forest owls, microbats, insectivorous birds and arboreal and ground dwelling reptiles.
- In areas with moderate to low slopes, these land types are generally been cleared or thinned for grazing.
- Areas that have been extensively managed for timber have been modified through selective thinning and frequent fire resulting in even aged stands with minimal habitat trees and poor stand succession.
- Retaining adequate numbers of habitat trees is important for forest health and biodiversity.
- The careful use of fire (especially following disturbance such as thinning or harvesting) allows forest regeneration and can be pro-actively used to promote biodiversity values within the land type and across the landscape.

Regional Ecosystems

12.9-10.18, 12.9-10.18a-b, 12.11.22.

Land resource area

Uplands sediments.

IB11 Ironbark and spotted gum on duplex and loam

Area of land type in region: 0.4%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 43%
Median FPC: 27%
Median TBA: 11 m2/ha

Queensland Government

Ironbark on basalt upper slopes and benches

Landform	Upper slopes and crests, including those on ridges, of undulating to low rises to steep hilly terrain and stony knolls.
Woody vegetation	Woodland or open forest of silver-leaved and/or narrow-leaved ironbarks in association with Queensland blue gum, variable-barked bloodwood, mountain coolibah and Moreton Bay ash. Understorey is usually absent.
Expected pasture composition	*Southern black speargrass pastures*. ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, forest bluegrass, Queensland bluegrass, scentedtop, hairy panic.
Intermediate	Spring grass, liverseed (urochloa) grass, bamboo speargrass, umbrella grass.
Non-preferred	Wiregrasses (e.g. dark), slender chloris.
Legumes	Rhynchosia, creeping tick trefoil, glycine pea, woolly glycine.
Annual grasses	Small burr grass.
Suitable sown pastures	Rhodes grass, panic (green), creeping bluegrass, buffel grass, Angleton grass, Caatinga stylo, Desmanthus.
Introduced weeds	
Soil	Generally deep (<150 cm), but occasionally shallow (<45 cm), black to brownish black self-mulching clays (black earths).
Description	***Surface:*** Self-mulching and cracking; sometimes weakly to crusting; ***Surface texture:*** light to medium clay; ***Subsoil texture:*** predominantly medium to heavy clay.
Features	Variable stone cover on surface and gravel though profile. Abundant calcium carbonate veins in subsoils. Decomposing rock may be present from 30 cm depth.
Water availability	Moderate to high PAWC.
Drainage	Moderately to well drained.

Rooting depth

Effective rooting depth variable 30 cm to >100 cm.

Fertility

High; moderate to high nitrogen; low or variable phosphorus; moderate to very high potassium.

Salinity

Non-saline or very low to low throughout.

Sodicity

Non-sodic.

pH

Alkaline soil reaction trend with surface slightly acidic or neutral (6.5–7.0), increasing alkalinity (pH 8.0) to strongly alkaline (pH 9.5) in subsoils >60 cm depth.

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 694 – 726 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	4580 - 4900	30%	2.0 – 2.1
	10 TBA 25 FPC	3430 - 3820	30%	2.6 – 2.8

Enterprise

Breeding and fattening.

Land use and management recommendations

- Suitable for grazing of native and improved pastures and cropping.
- Adopt practices such as minimum tillage and maintain maximum surface cover to retain organic matter, maintain soil structure and reduce erosion.
- Retain timber on ridges, along drainage lines, and at changes of slope at base of hills to lower watertable and control erosion and salinity.
- Use a coordinated drainage strategy of contour banks (narrow base type), waterways, diversion banks and dams to minimise risk of erosion (sheet, rill, gully). Avoid trafficking when wet to reduce soil compaction.

Land use limitations

- Narrow moisture range for successful cultivation.
- Surface crusting may occur with continual cultivation.
- Moderate to high erosion hazard, high risk of gully erosion where water is concentrated.
- Shallow soils and rockiness may restrict cultivation and harvesting of specific crops. Rock picking may be required to grow crops.
- Effective rooting depth reduced by weathered rock.

Conservation features and related management

- This woodland is an important wildlife habitat in providing tree hollows for possums, koalas and gliders; rough fissured bark for skinks and geckoes; grassy understorey for ground fauna such as small marsupials (bettongs), reptiles (frilled-neck lizards) and birds (quail); and important food resource for the large macropods (whip-tailed wallabies, eastern grey kangaroos).
- The health of the landscape can be enhanced through appropriate fire regimes, grazing management and allowing regrowth to develop into effective wildlife corridors.

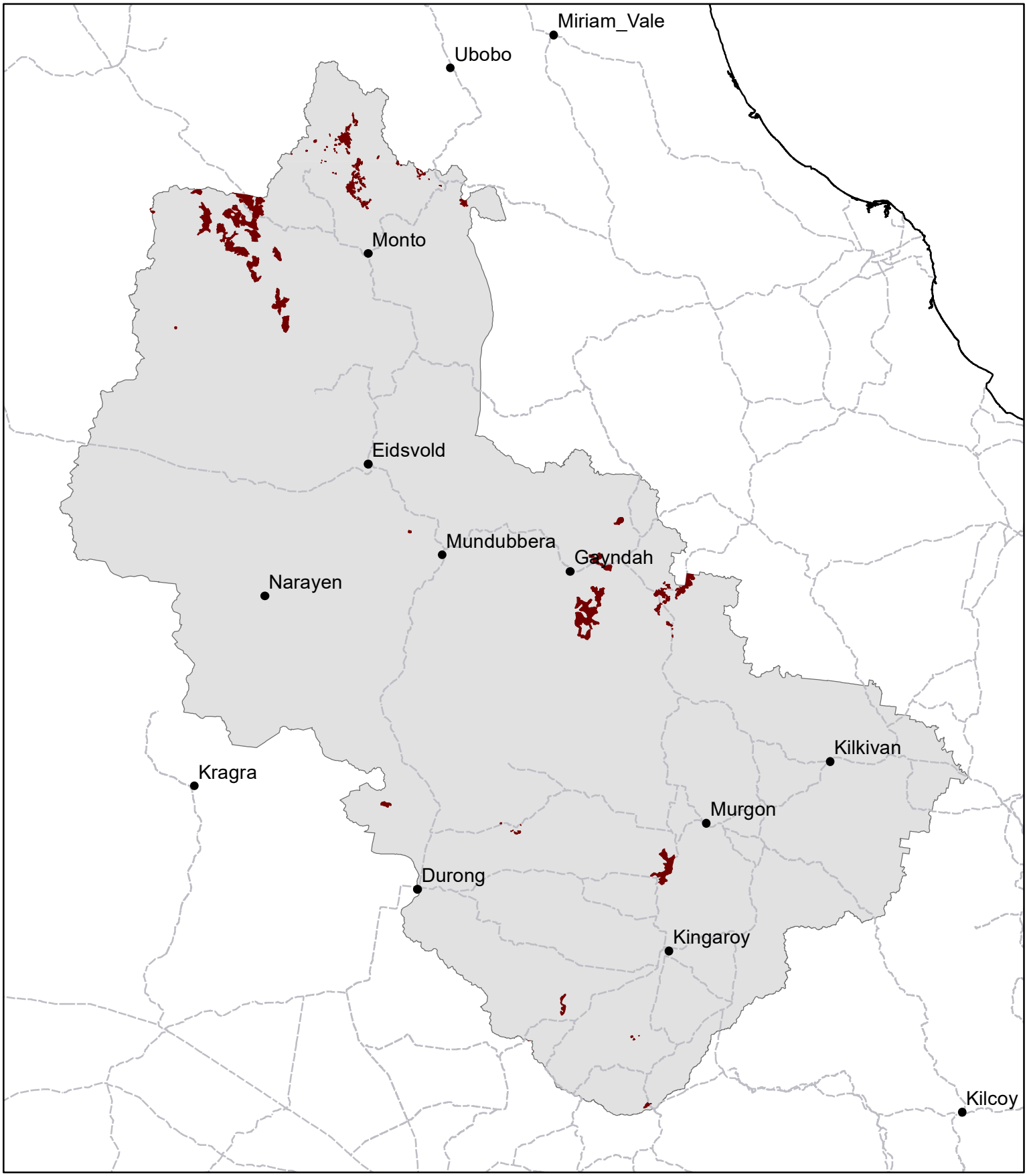
Regional Ecosystems

12.5.1e, 12.8.17.

Land resource area

Basalt rises.

IB12 Ironbark on basalt upper slopes and benches



Area of land type in region: 1%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 48%
Median FPC: 25%
Median TBA: 10 m2/ha

Queensland Government

Mixed open forests on duplex and loam

Landform	Widespread occurrence on mid, lower and upper slopes and crests of low basalt rises and stony knolls; upper slope positions on relict alluvial plains; mid and lower slopes of undulating plains and low hills, and mid to upper slopes of broad rises.
Woody vegetation	Open forest or woodland of gum-topped box, silver-leaved ironbark, narrow-leaved ironbark, with occasional Queensland blue gum, broad-leaved apple, pink bloodwood and spotted gum. Scattered occurrences of rusty gum, and wattle and dogwood.
Expected pasture composition	*Southern black speargrass pastures.* ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, Queensland bluegrass, kangaroo grass, hooky grass, leafy panic.
Intermediate	Slender chloris, slender rat's tail grass.
Non-preferred	Wiregrasses (e.g. dark), purple lovegrass, reedgrass.
Legumes	Woolly glycine, glycine pea.
Suitable sown pastures	Rhodes grass, creeping bluegrass, shrubby stylo.
Introduced weeds	
Soil	Yellow or brown texture contrast soils (solodics), deep red clay loams (euchrozem) or deep or shallow dark clays (black earths).
Description	***Surface:*** Crusting to hard-setting or weakly self-mulching; ***Surface texture:*** sandy clay loam, clay loam or light medium clay; ***Subsoil texture:*** light to medium to heavy clay.
Features	Bleached subsoils and concretionary carbonate below 70 cm common (solodics). Gravel may occur throughout profile (euchrozems, black earths).
Water availability	Low to moderate (solodic), moderate (black earth, euchrozem) PAWC.
Drainage	Poor or imperfect (solodic) to moderately well or well (black earth, euchrozem) drained.
Rooting depth	20–35 cm (solodic), 30 cm (black earth) and >100 cm (black earth, euchrozem)
Fertility	Medium. Low to moderate nitrogen; moderate to high phosphorus; low to moderate to very high potassium.

Salinity

Very low (black earths, euchrozem); low to moderate to high below 60 cm (solodics).

Sodicity

Non-sodic (black earths, euchrozem) to sodic to strongly sodic subsoil (solodic).

pH

Acid (pH 5.4) to slightly acid (pH 5.9–6.9) surface; neutral or alkaline (pH 9.0) at depth.

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 629 – 754 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	3570 - 3710	30%	2.6 – 2.7
	11 TBA 27 FPC	1200 - 2070	30%	4.7 – 8.1

Enterprise

Breeding and fattening.

Land use and management recommendations

- Suitable for grazing of native and improved pastures and cropping in some areas.
- Use of minimum tillage and maintenance of effective ground cover (>70%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on ridges, in drainage lines and at changes of slope at base of hills to lower watertable and control salinity.
- Burning every three years in winter or just prior to summer rains is an optimum regime to control regrowth (ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Low PAWC will restrict dryland crop growth. Poor drainage in subsoils due to sodicity.
- Surface sealing, hard-setting surfaces, narrow moisture range all affect crop establishment. Surface structure breaks down with continual cultivation (euchrozems).
- High to very high erosion hazard, subject to scalding and gully erosion (solodics).
- Moderate erosion hazard (black earths, euchrozems).

Conservation features and related management

- This woodland provides habitat for larger marsupials (e.g. wallabies); tree hollows for possums and gliders; rough fissured bark for skinks and geckoes; grass cover for ground fauna such as button-quail.
- Mosaic burning of patches for regeneration and retention of microhabitats is critical for maintaining species richness.
- Selective overgrazing in the burnt areas needs to be managed.
- Conservation management should aim to retain larger older trees with hollows and remnant patches especially where these offer connectivity values.

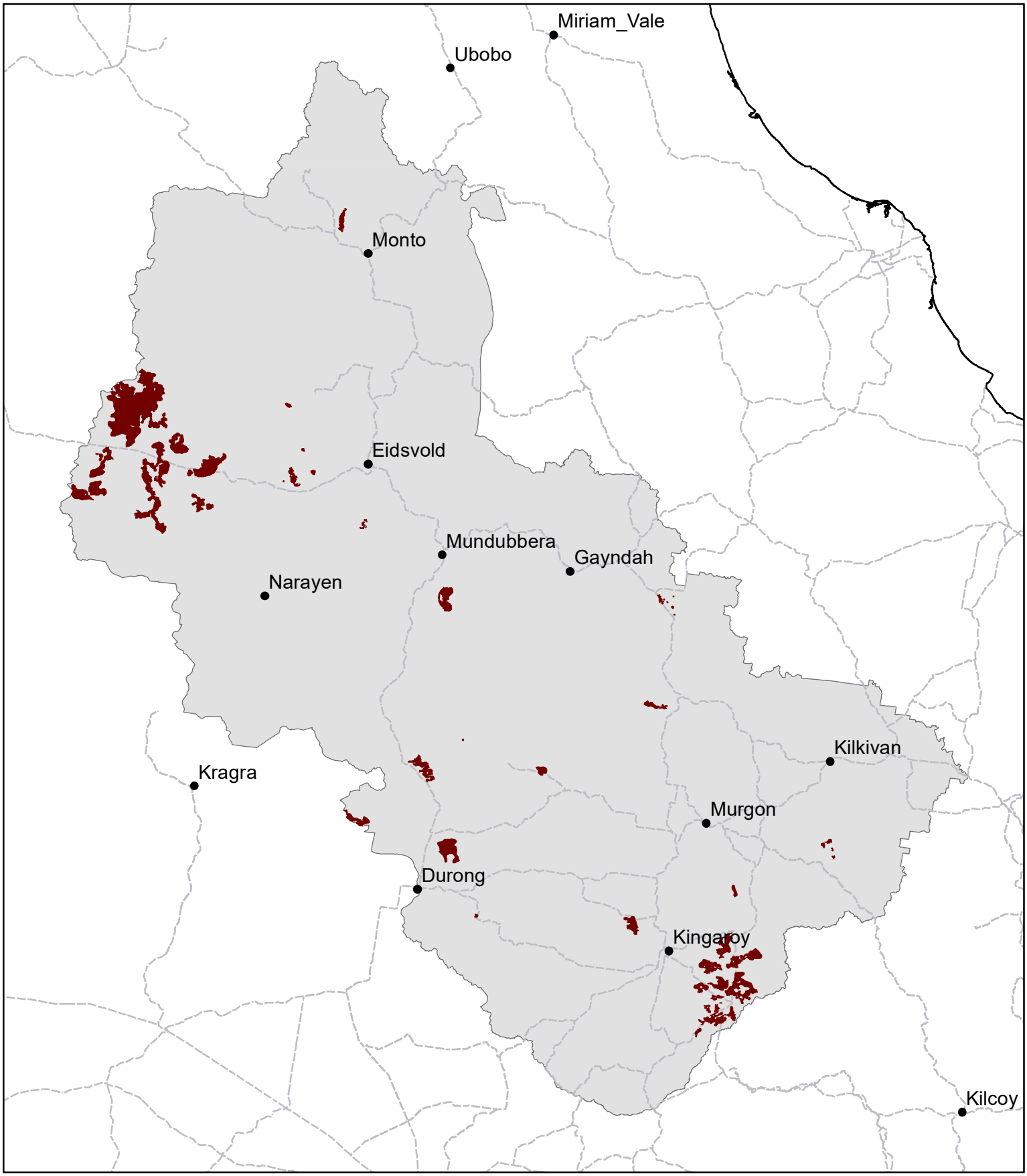
Regional Ecosystems

11.5.1, 11.5.2.

Land resource area

Basalt Rises; Volcanic Uplands; Terraces; Relict Alluvial Plains; Red Tablelands.

IB13 Mixed open forests on duplex and loam



Area of land type in region: 2%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 71%
Median FPC: 27%
Median TBA: 11 m2/ha

Queensland Government

Narrow-leaved ironbark on granite

Landform	Undulating rises to rolling hills.
Woody vegetation	Open forest to woodland of narrow-leaved ironbark, silver-leaved ironbark and Queensland blue gum and wattles.
Expected pasture composition	*Southern black speargrass pastures*. ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, red Natal grass*, barbwire grass, silky umbrella grass, hairy panic.
Non-indicator	Pitted bluegrass grass, niggerheads, bottlewasher grasses, woodland lovegrass.
Non-preferred	Wiregrasses (e.g. dark, erect kerosene), reedgrass, golden beard grass.
Legumes	Woolly glycine, emu foot, glycine pea.
Suitable sown pastures	Oversow with legumes: fine stem stylo, shrubby stylo, Wynn cassia.
Introduced weeds	Quinine berry
Soil	Shallow to moderately deep yellow, red or brown sandy duplex soils.
Description	***Surface:*** Hard-setting*;* ***Surface texture:*** loamy sand to sandy clay loam; ***Subsoil texture:*** medium clay.
Features	Stone free.
Water availability	Low (yellow) to moderate (brown) to high (red) PAWC.
Drainage	Poorly (yellow) or imperfect (brown) to moderately drained (red).
Rooting depth	Effective rooting depth 20 cm (yellow), 35 cm (brown) to 60 cm (red).
Fertility	Low; low nitrogen, very low to low phosphorus, very low to moderate potassium.
Salinity	Non-saline (red), very low (yellow), low to moderate below 50 cm (brown).
Sodicity	Non-sodic (red), strongly sodic below 50–70 cm (yellow, brown).

pH

Alkaline soil reaction trend. Slightly acidic at surface, increasing alkalinity (pH 6.0–7.5) upper subsoils and moderately alkaline (7.8–9.5) in lower subsoils.

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 629 – 816 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	2870 - 3250	25%	3.7 – 4.1
	8 TBA 20 FPC	1430 - 1990	25%	5.9 – 8.2

Enterprise

Breeding and stores.

Land use and management recommendations

- Suitable for grazing of native and improved pastures, short-term cropping only on red soils.
- Maintenance of effective ground cover (>50%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on stony ridges, in drainage lines and at changes of slope at base of hills to control erosion (particularly tunnel erosion).
- Burning is recommended every 2–3 years to control regrowth (blue gum, ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Shallow effective rooting depth and poor internal drainage (yellow, brown).
- Low fertility. Low PAWC will restrict dryland crop growth.
- Hard-setting surface affects infiltration and cultivation.
- Small seeded crops and pasture difficult to establish due to rapid drying and sealing of sandy surface.
- Moderate erosion hazard on low to moderate slopes (red, brown).
- Very high erosion hazard and particularly prone to tunnel erosion (yellow).

Conservation features and related management

- Extensively cleared for native pasture in some areas; relatively intact in others.
- These are generally grassy woodlands that provide habitat for larger marsupials.
- Hollow-bearing habitat trees are important nesting sites for birds and arboreal mammals.
- Landscape health can be enhanced through appropriate fire regimes, grazing management an allowing regrowth to develop into effective wildlife corridors.

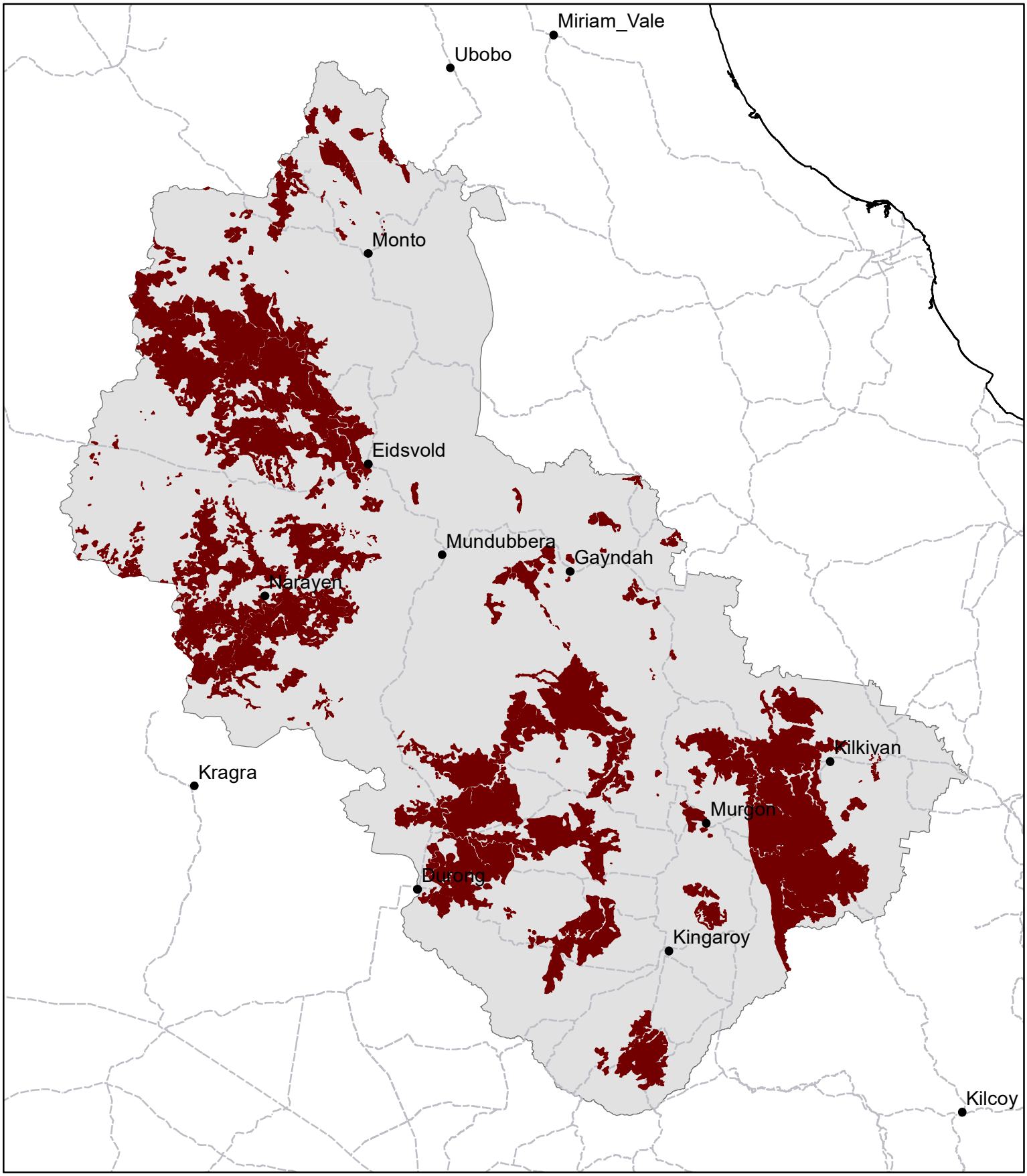
Regional Ecosystems

11.12.1, 12.12.7, 12.12.24.

Land resource area

Granite Hills.

IB14 Narrow-leaved ironbark on granite



Area of land type in region: 21%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 55%
Median FPC: 20%
Median TBA: 8 m2/ha

Queensland Government

Narrow-leaved ironbark and wattles

Landform	Crests and slopes of steep hills and mountains.
Woody vegetation	Woodland to open forest of narrow-leaved ironbark, silver-leaved, bloodwood, and spotted gum. If understorey present often wattles, rosewood, whitewood or beefwood.
Expected pasture composition	*Southern black speargrass pastures*. ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, barbwire grass, pitted bluegrass, native oatgrass, kangaroo grass.
Intermediate	Many-headed grass, kerosene grass, bottlewasher grasses.
Non-preferred	White speargrass.
Legumes	Narrow-leaved indigo, glycine pea.
Suitable sown pastures	Oversow with shrubby stylo.
Introduced weeds	Lantern bush, blue heliotrope.
Soil	Shallow (<50 cm) loamy soils and shallow to moderately deep (<120 cm) texture contrast, gravelly soils.
Description	***Surface:*** Hard-setting*;* ***Surface texture:*** loamy sand to sandy clay loam to clay loam; ***Subsoil texture:*** loamy sand to medium to medium heavy clay.
Features	Lithosols have very stony (surface cobble and gravel) shallow profiles. Often conspicuously bleached subsurface soils.
Water availability	Low to moderate PAWC.
Drainage	Well drained (lithosol) to poorly (texture contrast).
Rooting depth	Effective rooting depth 20–40 cm.
Fertility	Low; low nitrogen, low (texture contrast) to moderate (lithosol) phosphorus, moderate potassium.
Salinity	Non-saline.

Sodicity

Non-sodic (lithosol); sodic (texture contrast) subsoils.

pH

Acidic surface (pH 5.5–6.5); neutral (pH 6.0–7.5) to alkaline subsoils (pH 7.8–8.6).

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 629 – 754 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	3440 - 3730	20%	3.9 – 4.2
	16 TBA 39 FPC	1210 - 1730	20%	8.5 – 12

Enterprise

Breeding

Land use and management recommendations

- Suitable for grazing of native and improved pastures.
- Maintenance of effective ground cover (>60%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on ridges and at changes of slope at base of hills to lower watertable and control erosion (particularly tunnel erosion).
- Burning is recommended every 2–3 years to control regrowth (ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Shallow effective rooting depth, very stony lithosol profiles.
- Low PAWC, low to very low fertility.
- Small seeded pasture difficult to establish due to rapid drying and sealing of sandy surface.
- Narrow moisture range for successful cultivation.
- Root development affected by impermeable and saline subsoils.
- High erosion hazard and prone to scalding, gully and tunnel erosion.

Conservation features and related management

- This woodland is an important wildlife habitat with a surprisingly wide range of fauna.
- Numerous tree hollows are home to possums and gliders.
- The rough fissured bark provides good reptile habitat, for skinks and geckoes.
- A good grass cover protects slopes and hillsides from erosion and provides habitat for ground fauna such as the painted button-quail.
- 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.
- The sandy soils are readily eroded.

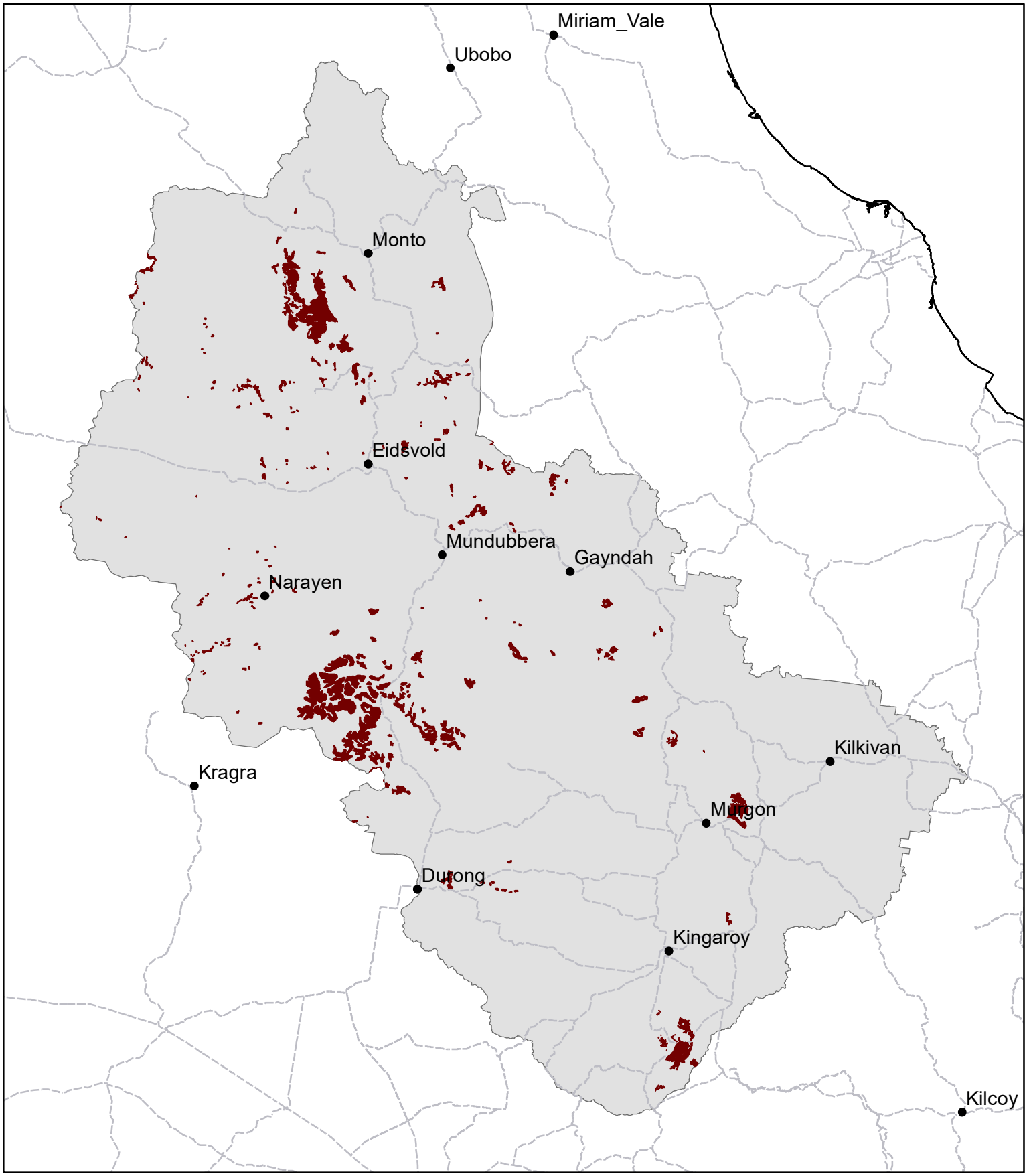
Regional Ecosystems

11.7.4c, 11.12.1a, 12.5.1a, 12.7.1, 12.7.2, 12.11.19, 12.12.25.

Land resource area

Ranges.

IB15 Narrow-leaved ironbark and wattles



Area of land type in region: 2%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 91%
Median FPC: 39%
Median TBA: 16 m2/ha

Queensland Government

Silver-leaved ironbark on cracking clay

Landform	Undulating plains to rolling hills.
Woody vegetation	Open forest or woodland of silver-leaved ironbark and Queensland blue gum with occasional narrow-leaved ironbark, variable-barked bloodwood. Understorey is usually absent.
Expected pasture composition	*Southern black speargrass pastures.* ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, forest bluegrass, Queensland bluegrass, scentedtop, paspalum*.
Intermediate	Native millet, hairy panic, barbwire grass, slender chloris.
Non-preferred	Wiregrasses (e.g. dark).
Legumes	Woolly glycine, rhynchosia, glycine pea.
Annual grasses	Small burr grass.
Suitable sown pastures	Creeping bluegrass, Rhodes grass, Caatinga stylo, Desmanthus, leucaena on deep soils.
Introduced weeds	
Soil	Shallow to moderately deep to deep dark cracking clays (black earths).
Description	***Surface:*** self-mulching to weakly self-mulching and crusting; ***Surface texture:*** light to medium clay; ***Subsoil texture:*** light sandy clay loam to medium clay.
Features	Some iron, manganese and calcium carbonate segregations present in black earth soils. Weathered basalt present at 30 cm depth in shallow soils.
Water availability	Moderate to high PAWC.
Drainage	Moderately to well drained.

Rooting depth

Effective rooting depth variable 30 cm to >100 cm.

Fertility

High; moderate to high nitrogen; low or variable phosphorus; moderate to very high potassium.

Salinity

Non-saline or very low to low throughout.

Sodicity

Non-sodic

pH

Alkaline soil reaction trend. Strongly alkaline (pH 9.5) >60 cm depth in some soils.

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 663 – 694 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	4910 - 5110	30%	1.9 – 2.0
	10 TBA 25 FPC	2960 - 3160	30%	3.1 – 3.3

Enterprise

Breeding and fattening.

Land use and management recommendations

- Suitable for grazing of native and improved pastures and cropping.
- Use of minimum tillage and maintenance of effective ground cover (>50%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on ridges, in drainage lines and at changes of slope at base of hills to lower watertable and control salinity.
- Burning is recommended every 2–3 years to control regrowth (ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Narrow moisture range for successful cultivation.
- Surface crusting may occur with continual cultivation.
- Moderate to high erosion hazard, high risk of gully erosion where water is concentrated.
- Shallow soils and rockiness may restrict cultivation and harvesting of specific crops. Rock picking may be required to grow crops.
- Effective rooting depth reduced by weathered rock.

Conservation features and related management

- These basalt ridges are associated with several significant eucalypts and these communities have outstanding fauna value, especially for arboreal hollow dwellers.
- The health of the landscape can be enhanced through appropriate fire regimes, grazing management and allowing regrowth to develop into effective wildlife corridors.

Regional Ecosystems

12.12.8.

Land resource area

Basalt Rises.

IB16 Silver-leaved ironbark on cracking clay

Area of land type in region: 0.4%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 23%
Median FPC: 25%
Median TBA: 10 m2/ha

Queensland Government

Silver-leaved ironbark on granite

Landform	Undulating rises with broad hill crests on granite.
Woody vegetation	Open forest to woodland of silver-leaved ironbark, narrow-leaved ironbark and Queensland blue gum. Understorey of wattles and minor beefwood.
Expected pasture composition	*Southern black speargrass pastures*. ** Denotes non-native "Expected Pasture Composition" species*
Preferred	Black speargrass, red Natal grass*, barbwire grass.
Intermediate	Pitted bluegrass grass, many-headed wiregrass, silky umbrella grass, feathertop Rhodes grass*.
Non-preferred	Dark wiregrass, reedgrass, golden beard grass.
Legumes	Rattlepods, Birdsville indigo, glycine pea.
Suitable sown pastures	Creeping bluegrass, fine stem stylo, shrubby stylo, Wynn cassia.
Introduced weeds	
Soil	Shallow to moderately deep yellow, red or brown texture contrast soils.
Description	***Surface:*** Hard-setting; ***Surface texture:*** loamy sand to sandy clay loam; ***Subsoil texture:*** medium clay.
Features	Stone free.
Water availability	Low (yellow) to high (red) PAWC.
Drainage	Poorly drained (yellow) to moderately drained (red).
Rooting depth	Effective rooting depth 20 cm (yellow) to 60 cm (red).
Fertility	Low; low to moderate nitrogen, very low phosphorus, low to moderate to high potassium.
Salinity	Low to non-saline.

Sodicity

Non-sodic (red), strongly sodic below 50 cm (yellow).

pH

Alkaline soil reaction trend, slightly acidic at surface, increasing alkalinity (pH 6.0–7.5) upper subsoils and moderately alkaline (7.8–8.6) in lower subsoils.

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 631 – 707 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	2860	30%	3.4
	10 TBA 25 FPC	1380 - 1480	30%	6.6 – 7.1

Enterprise

Breeding and stores.

Land use and management recommendations

- Suitable for grazing of native and improved pastures, short-term cropping only on red soils.
- Maintenance of effective ground cover (>50%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on stony ridges and at changes of slope at base of hills to control erosion (particularly tunnel erosion).
- Burning is recommended every 2–3 years to control regrowth (blue gum, ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Shallow effective rooting depth and poor internal drainage (yellow).
- Low fertility.
- Low PAWC will restrict dryland crop growth.
- Hard-setting surface affects infiltration and cultivation.
- Small seeded crops and pasture difficult to establish due to rapid drying and sealing of sandy surface.
- Moderate erosion hazard on low to moderate slopes (red).
- Very high erosion hazard and particularly prone to tunnel erosion (yellow).

Conservation features and related management

- Older silver-leaved ironbark trees frequently have hollows favoured by brushtail possums. 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 such as wallabies and 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.
- Mature trees can easily be burnt through at the base and therefore frequent burning can lead to loss of these important habitat trees.

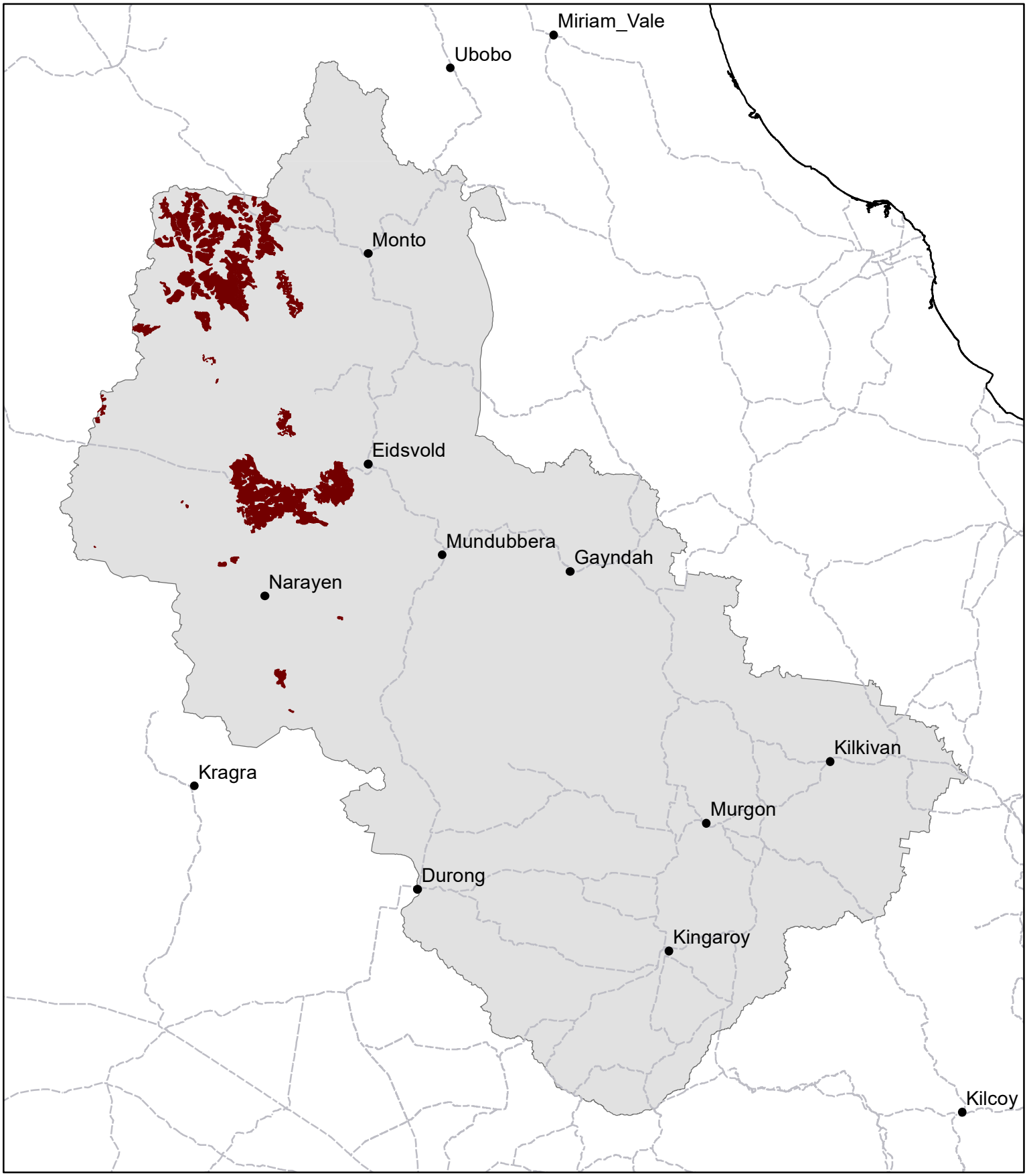
Regional Ecosystems

11.9.2.

Land resource area

Granite Hills.

IB17 Silver-leaved ironbark on granite



Area of land type in region: 2%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 46%
Median FPC: 25%
Median TBA: 10 m2/ha

Queensland Government

Softwood scrub

Landform	Mid to upper slopes and crests of gently sloping remnant plateaus and near scarp margins; slopes below scarps; and low hills adjacent to plateau remnants.
Woody vegetation	Softwood scrub (vines, bottle trees, white cedar, crows ash, figs) and open forest to open woodland of narrow-leaved ironbark in association with Queensland blue gum, blackbutt, spotted gum, Gympie messmate, grey gum, tallowwood or Yarraman ironbark depending on landscape position. Occasional bloodwoods, rusty gums, she-oaks and silver-leaved ironbarks with an understorey of wattles, red ash and dogwood.
Expected pasture composition	** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Green panic*
Intermediate	
Non-preferred	Wiregrasses
Legumes	Woolly glycine, glycine pea.
Suitable sown pastures	Green panic, Rhodes grass, buffel grass, Gatton panic, digit grass, tall finger grass, shrubby stylo, Caatinga stylo, Wynn cassia, siratro, leucaena.
Introduced weeds	Lantana
Soil	Shallow (red earths) to deep red clay loams (krasnozems) and brown non-cracking clays (prairie soils).
Description	***Surface:*** loose to crusting, when firm can be loose when dry*;* ***Surface texture:*** loam to clay loam to light clay; ***Subsoil texture:*** clay loam to light clay to medium clay.
Features	Ironstone and gravel present in small (krasnozems) and large (red earth) amounts in subsoils. Occasional gravel in prairie soils.
Water availability	Low (red earths) to moderate PAWC (krasnozems, prairie).
Drainage	Well drained (krasnozems, prairie, red earths).
Rooting depth	Effective rooting depth >60 cm (red earths) >100 cm (prairie, krasnozems).

Fertility

Moderate to very high; moderate (krasnozems) to high (prairie) to very high (red earths) nitrogen, moderate (krasnozems, red earths) to very high (prairie) phosphorus, high (krasnozems) to very high (prairie, red earths) potassium.

Salinity

Very low saline surface, non-saline below (krasnozems, prairie, red earths).

Sodicity

Non-sodic (krasnozems, prairie, red earths).

pH

Moderately acidic (pH 5.5 to 6.0, red earths) to slightly acidic (pH 6.0–6.5, krasnozems) to neutral (pH 7.0, prairie) at surface; increasing acidity (pH 5.0–5.5 red earths, 6.0 krasnozems) and increasing alkalinity (pH >8.5 below 50 cm, prairie) down profile.

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 632 – 754 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	5220 - 5430	30% (sown)	1.8 – 1.9
	20 TBA 47 FPC	1880 - 2450	30% (sown)	4.0 – 5.2

Enterprise

Fattening

Land use and management recommendations

- Suitable for grazing of native and improved pastures and cropping, short term only on prairie soils.
- Use of minimum tillage and maintenance of effective ground cover (>50%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on ridges, in drainage lines and at changes of slope at base of hills to lower watertable and control salinity.

Land use limitations

- Low plant available water; shallow effective rooting depth; stoniness of subsoils; acidic soils.
- Moderate to high erosion hazard due to low to moderate erodibility and moderate to steep slopes.

Conservation features and related management

- Very few scrub remnants remain, and those that do are small and isolated.
- Habitat for rare and threatened flora and fauna.
- Remnants are threatened by weed invasion and fire on their margins.
- The use of fire breaks and cool season burns reduce this risk.
- Natural regeneration should be encouraged to develop connectivity with other areas of remnant vegetation.

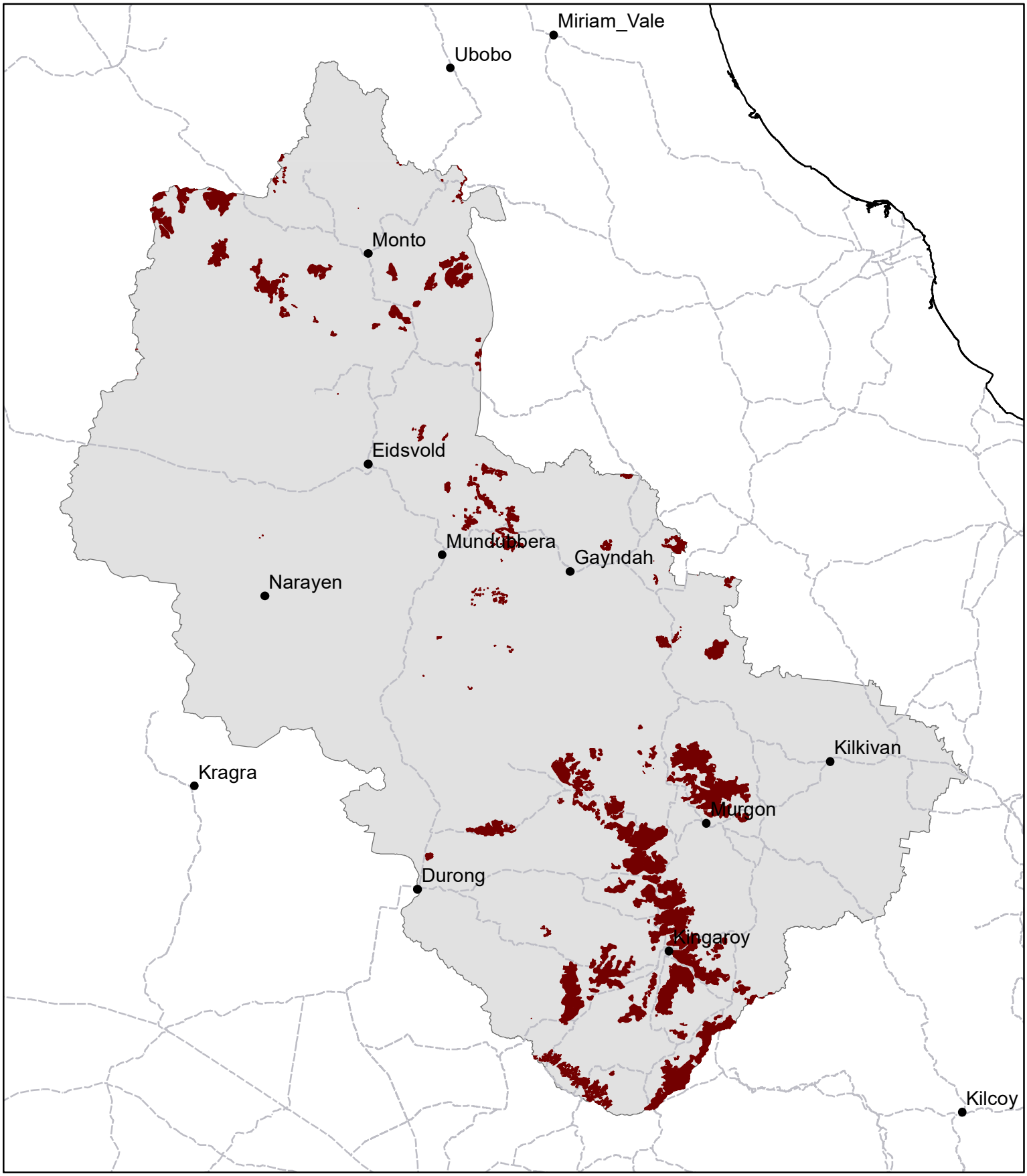
Regional Ecosystems

11.5.15, 11.9.4a, 11.9.4c, 11.11.5a, 12.5.1b, 12.5.13, 12.8.13, 12.8.21, 12.12.18, 12.5.13a-c.

Land resource area

Undulating Plains; Red Tablelands.

IB18 Softwood scrub



Area of land type in region: 5%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 32%
Median FPC: 47%
Median TBA: 20 m2/ha

Queensland Government

Spotted gum ridges

Landform	Crests and hillslopes of undulating rises to low hills to mountains.
Woody vegetation	Spotted gum open forest or woodland frequently associated with narrow-leaved ironbark. Other species that may occur include bloodwoods, rusty gum, and gum-topped box. An understorey may include red ash, currant bush, grevilleas and wattles.
Expected pasture composition	*Wiregrass – pitted bluegrass pastures*. ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, barbwire grass, pitted bluegrass, native oatgrass, kangaroo grass.
Intermediate	Erect kerosene grass, kerosene grass, silkyheads.
Non-preferred	Dark wiregrass, five-minute grass, comet grass.
Legumes	Rattlepods, glycine pea.
Suitable sown pastures	None suitable.
Introduced weeds	Lantern bush.
Soil	Very shallow to shallow (<50 cm) sandy, loamy lithosols.
Description	***Surface:*** Loose to hard-setting*;* ***Surface texture:*** loamy sand; ***Subsoil texture:*** loamy sand to weathered bedrock.
Features	Very stony profiles, with surface cobble and gravel, frequent rock outcrops.
Water availability	Low PAWC.
Drainage	Well drained.
Rooting depth	Effective rooting depth 20 cm.
Fertility	Low; very low nitrogen, moderate phosphorus, moderate potassium.
Salinity	Low

Sodicity

Non-sodic.

pH

Acid (pH 5.8–6.5) soil reaction trend.

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 629 – 754 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	2580 - 2940	20%	5.0 – 5.7
	14 TBA 34 FPC	670 - 1540	20%	9.5 – 22

Enterprise

Breeding

Land use and management recommendations

- Suitable for light grazing of native pastures.
- Maintenance of effective ground cover (>60%) and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber to lower watertable and control erosion.
- Burning is recommended every 2–3 years to control regrowth (ironbarks, wattles, red ash) and to enhance preferred pasture species.

Land use limitations

- Shallow effective rooting depth, very stony profiles.
- Low PAWC, very low fertility.
- Very high erosion hazard.

Conservation features and related management

- These extensive spotted gum forests provide valuable resources for a suite of forest dependent fauna including possums and gliders, koalas, forest owls, microbats, and insectivorous birds. The more enigmatic species include the yellow-bellied glider and the greater glider, the powerful owl, the red goshawk, and little pied bat.
- Coral snakes and bandy-bandy snakes are found in this land type.
- This land type is seasonally important as a nectar/pollen source for bees.
- Large fallen trees are good habitat for ground dwelling animals.
- Areas that have been extensively managed for timber have been modified through selective thinning and frequent fire resulting in even aged stands with minimal habitat trees and poor stand succession.
- Retaining adequate numbers of habitat trees is important for forest health and biodiversity.
- The careful use of fire (especially following disturbance such as thinning or harvesting) allows forest regeneration and can be pro-actively used to promote biodiversity values within the land type and across the landscape.

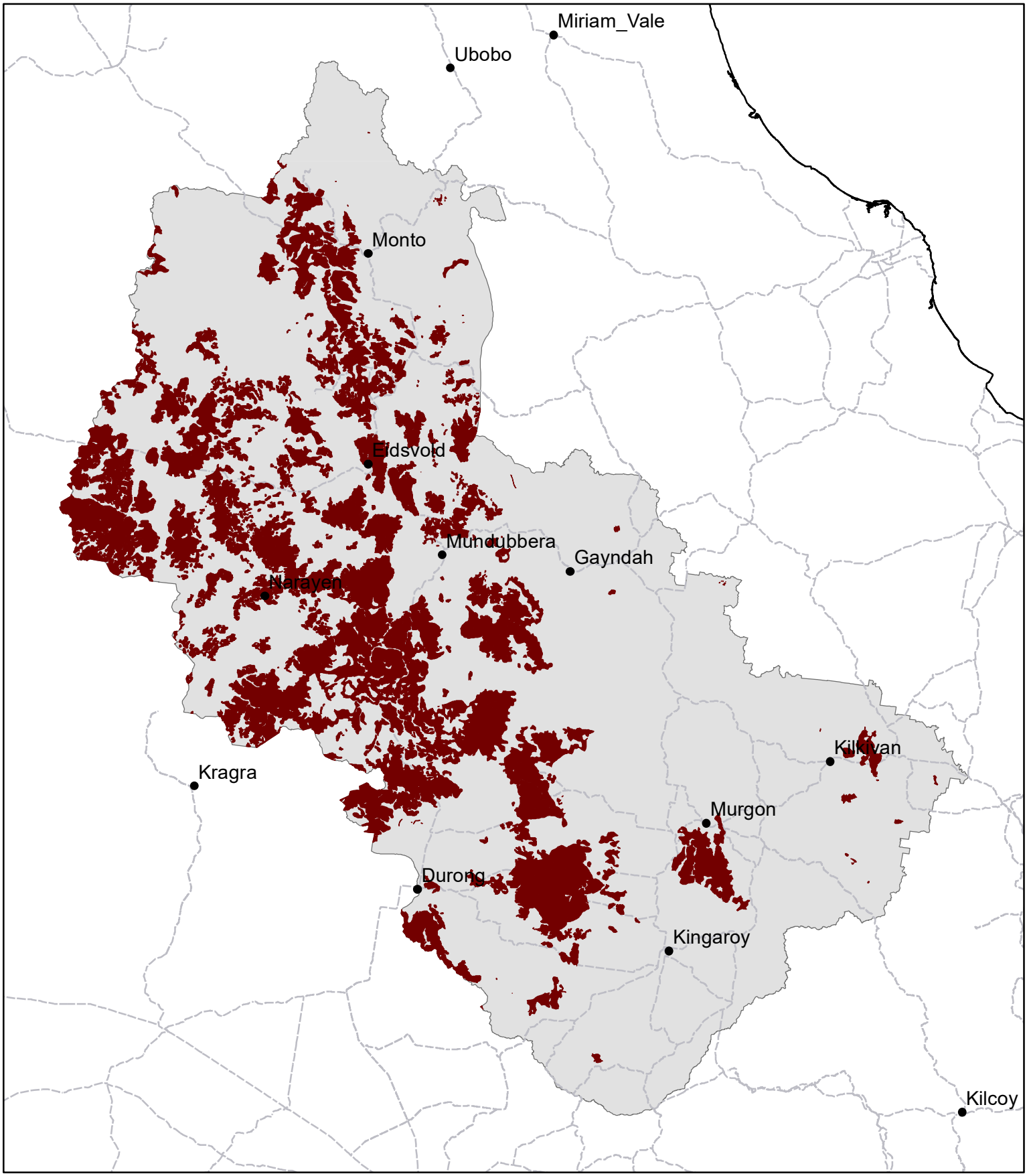
Regional Ecosystems

11.7.5, 11.7.6, 11.10.1, 11.11.4a, 11.12.6, 12.12.10.

Land resource area

Ranges.

IB19 Spotted gum ridges



Area of land type in region: 22%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 80%
Median FPC: 34%
Median TBA: 14 m2/ha

Queensland Government

Tall open forest on snuffy soils

Landform	Upper slopes and crests of plateau remnants and some low rises.
Woody vegetation	Closed softwood scrub associated with open forest of narrow-leaved ironbark, grey gum, tallowwood, Gympie messmate and Yarraman ironbark with occasional bloodwoods, spotted gums and understorey of wattles and red ash.
Expected pasture composition	*Southern black speargrass pastures.* ** Denotes non-native "Expected Pasture Composition" species.*
Preferred	Black speargrass, Queensland bluegrass, kangaroo grass, hooky grass, leafy panic.
Intermediate	Slender chloris, slender rat's tail grass.
Non-preferred	Wiregrasses (e.g. dark), purple lovegrass, reedgrass.
Legumes	Woolly glycine, glycine pea.
Suitable sown pastures	Rhodes grass, creeping bluegrass, green panic, digit grass, tall finger grass, leucaena, shrubby stylo, Caatinga stylo, Wynn cassia.
Introduced weeds	Lantana.
Soil	Generally deep (>120 cm) reddish brown gradational clay loams soils (krasnozem).
Description	***Surface:*** Snuffy, loose to moderately hard-setting*;* ***Surface texture:*** sandy loam to light clay; ***Subsoil texture:*** light to medium clay.
Features	Surface becomes water repellent when dry and powdery (snuffy). Ironstone gravel frequently present. Stone free.
Water availability	Low PAWC.
Drainage	Well drained.

Rooting depth

Effective rooting depth >100 cm.

Fertility

Moderate to high; moderate to high nitrogen; low phosphorus; moderate to high potassium.

Salinity

Non-saline

Sodicity

Non-sodic

pH

Acid soil reaction trend (pH 5.0–6.5).

Long-term carrying capacity information (A condition)

Based on fully watered area for 1AE = 450 kg animal consuming 8kg DM/day				
Median annual rainfall 663 – 754 mm				
Pasture type	Median tree cover (TBA m^2/ha) (FPC %)	Median annual pasture growth (DM kg/ha)	Safe annual utilisation pasture growth (%)	LTCC (ha/AE)
Native species	0 TBA/FPC	5080 - 5480	30%	1.8 – 1.9
	17 TBA 41 FPC	1990 - 2530	30%	3.9 – 4.9

Enterprise

Breeding and fattening.

Land use and management recommendations

- Suitable for grazing of native and improved pastures and cropping.
- Maintenance of effective ground cover (>70%), use of minimum tillage and conservative stocking practices (spelling pastures, flexible stocking rates) are important to retain organic matter, maintain soil structure, reduce runoff and minimise risk of erosion.
- Retain timber on ridges and in drainage lines to lower watertable and control salinity.
- Burning is recommended every 4–6 years to control regrowth (spotted gum, ironbarks, wattles) and to enhance preferred pasture species.

Land use limitations

- Low PAWC will restrict dryland crop growth.
- Surface dries out easily, particularly when cultivated, becoming powdery and water repellent which may affect crop establishment and growth.
- Disturbed soils are particularly prone to wind erosion.
- Moderate to high erosion hazard.

Conservation features and related management

- This land type has been moderately developed for grazing in some areas but there are many intact remnants in steeper country. These provide valuable corridors through the landscape for transitional and migratory birds and mammals and are an important source of timber. These remnants support sugar gliders, arboreal marsupials, smaller macropods, hollow breeding birds, birds of prey and microbats.
- Retention of ground litter provides important habitat for ground dwelling reptiles and is important in preventing erosion on the snuffy red soils.

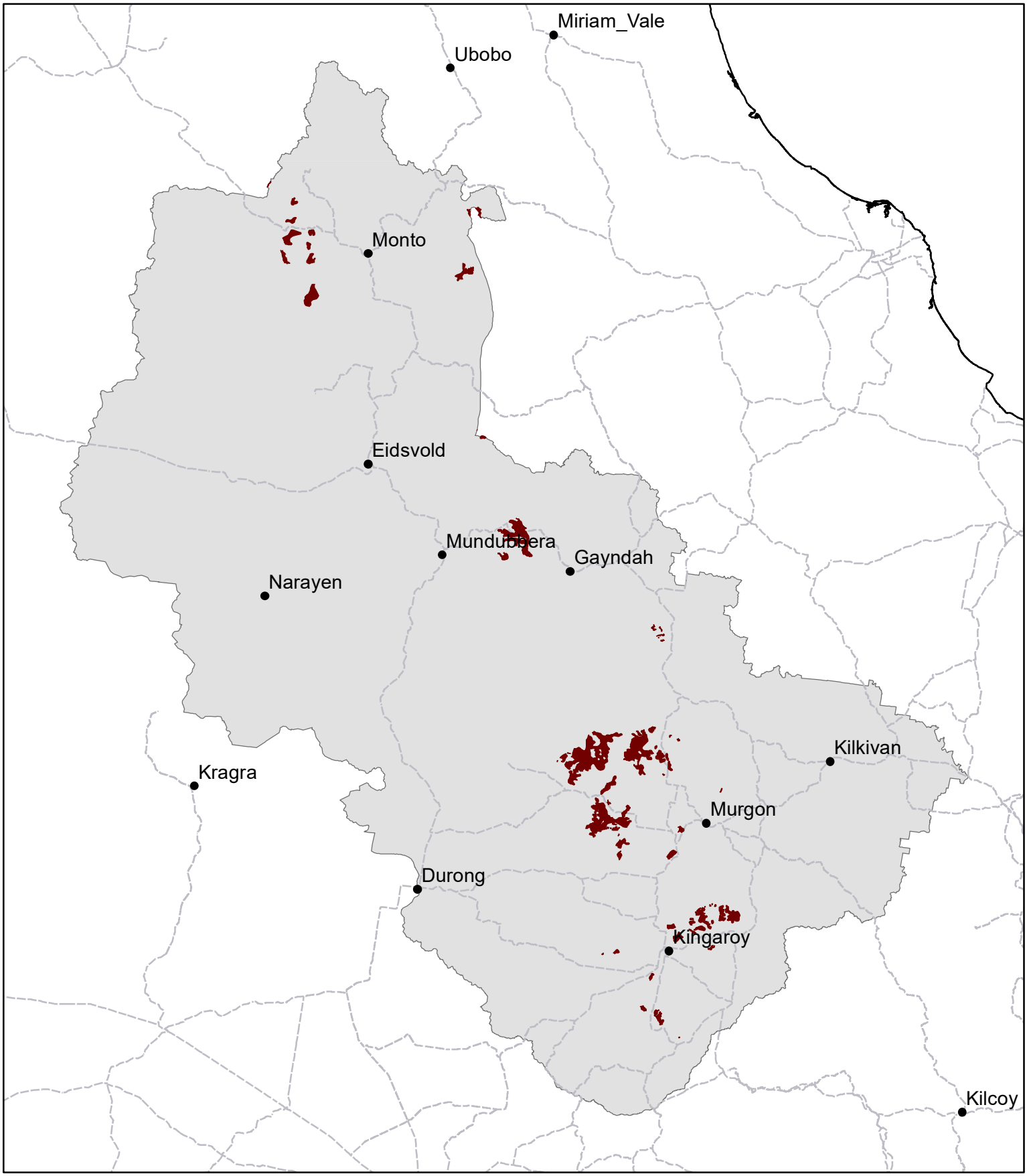
Regional Ecosystems

12.5.1,12.5.6c.

Land resource area

Red Tablelands.

IB20 Tall open forest on snuffy soils



Area of land type in region: 1%
Median rainfall (region): 529 – 1018 mm
Average rainfall (region): 560 – 1070 mm
Area of land type with FPC: 76%
Median FPC: 41%
Median TBA: 17 m2/ha

Queensland Government