

# Mackay Whitsunday region Grazing Land Management land type information

## Plant Index

| Common name           | Scientific name                                  | Page                         |
|-----------------------|--|------------------------------|
| Aleman grass*         | <i>Echinochloa polystachya</i> cv. Amity         | MW05                         |
| Alysicarpus           | <i>Alysicarpus</i> spp.                          | MW02, MW08                   |
| Angleton grass*       | <i>Dicanthium aristatum</i> cv. Floren           | MW01, MW02, MW08             |
| barnyard grass        | <i>Echinochloa</i> spp.                          | MW03, MW05                   |
| black ironbox         | <i>Eucalyptus raveretiana</i>                    | MW05                         |
| black speargrass      | <i>Heteropogon contortus</i>                     | MW01, MW02, MW04, MW06, MW08 |
| black tulip oak       | <i>Argyrodendron polyandrum</i>                  | MW09                         |
| blady grass           | <i>Imperata cylindrica</i>                       | MW01, MW02, MW04, MW06, MW08 |
| blue gum              | <i>Eucalyptus saligna</i>                        | MW01, MW03, MW05             |
| bluegrass             | <i>Bothriochloa</i> spp.                         | MW01, MW04                   |
| broad-leaved tea tree | <i>Melaleuca viridiflora</i>                     | MW02, MW04                   |
| bull oak              | <i>Hakea chordophylla</i>                        | MW04                         |
| bulrushes             | <i>Typha domingensis</i>                         | MW03, MW05                   |
| bumpy/silver ash      | <i>Flindersia schottiana</i>                     | MW03                         |
| cabbage gum           | <i>Corymbia confertiflora</i>                    | MW02                         |
| cabbage palm          | <i>Livistona decipiens</i>                       | MW04, MW05                   |
| centro*               | <i>Centrosema molle</i> cvv. Cardillo            | MW03, MW04                   |
| clovers*              | <i>Trifolium</i> spp.                            | MW09                         |
| creeping bluegrass*   | <i>Bothriochloa insculpta</i> cvv. Bisset, Hatch | MW01, MW02, MW03, MW06, MW08 |
| creeping vigna*       | <i>Vigna parkeri</i> cv. Shaw                    | MW09                         |
| <i>Desmodium</i>      | <i>Desmodium muerelli</i>                        | MW02, MW08                   |
| devil's fig           | <i>Solanum torvum</i>                            | MW02, MW04, MW08             |
| flannel weed          | <i>Sida cordifolia</i>                           | MW02, MW04, MW08             |
| flooded gum           | <i>Eucalyptus grandis</i>                        | MW09                         |
| forest bluegrass      | <i>Bothriochloa bladhii</i>                      | MW01, MW02, MW06, MW08       |

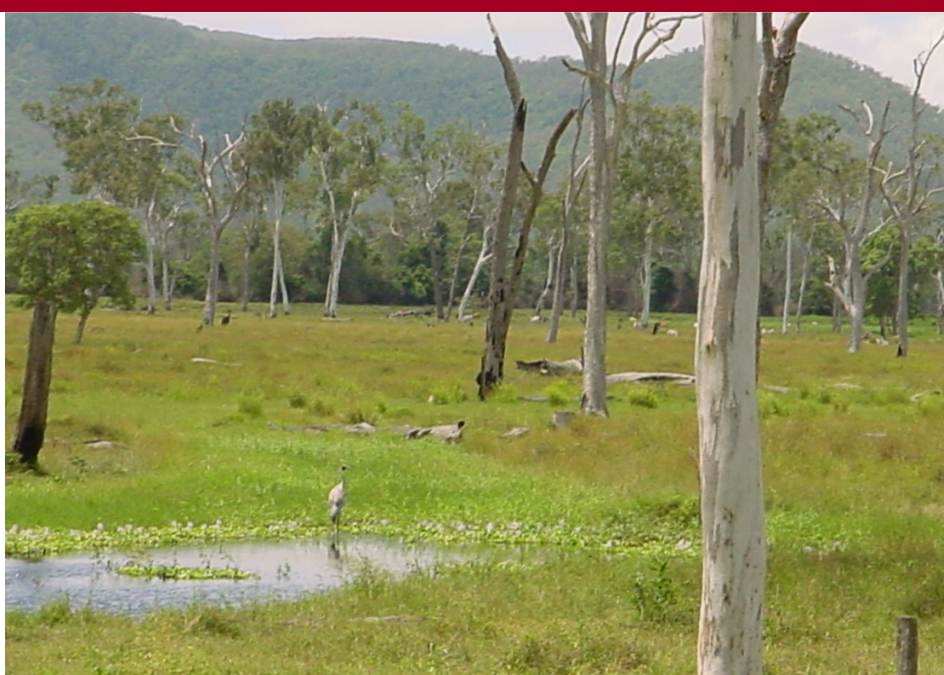
| Common name                                  | Scientific name   | Page                                     |
|--|---|--|
| forest siris                                 | <i>Albizia procera</i>                                      | MW03                                     |
| fringe rush                                  | <i>Fimbristylis littoralis</i>                              | MW07                                     |
| giant rat's tail grass*                      | <i>Sporobolus pyramidalis</i>                               | MW01, MW02, MW04, MW06, MW08, MW09       |
| giant black speargrass                       | <i>Heteropogon triticeus</i>                                | MW01, MW04                               |
| glycine                                      | <i>Glycine</i> spp.   | MW02, MW08                               |
| golden beard grass                           | <i>Chrysopogon fallax</i>                                   | MW02, MW04, MW06, MW08                   |
| grader grass*                                | <i>Themeda quadrivalvis</i>                                 | MW02, MW04, MW08                         |
| grasstree                                    | <i>Xanthorrhoea johnsonii</i>                               | MW04                                     |
| green panic*                                 | <i>Panicum maximum</i> var. <i>trichoglume</i>              | MW02, MW06, MW08                         |
| grevillea                                    | <i>Grevillea</i> spp.                                       | MW04                                     |
| grey ironbark                                | <i>Eucalyptus creba</i> (includes <i>E. drepanophylla</i> ) | MW02, MW06                               |
| guinea grass*                                | <i>Megathyrsus maximus</i> (Syn. <i>Panicum maximum</i> )   | MW03                                     |
| hoop pine                                    | <i>Araucaria cunninghamii</i>                               | MW09                                     |
| hymenachne*                                  | <i>Hymenachne amplexicaulis</i> cv. Olive                   | MW05, MW07                               |
| Indian bluegrass                             | <i>Bothriochloa pertusa</i>                                 | MW02, MW06                               |
| joint-vetch*                                 | <i>Aeschynomene americana</i> ; <i>A villosa</i>            | MW01, MW02, MW03, MW04, MW05, MW06, MW08 |
| kangaroo grass                               | <i>Themeda triandra</i>                                     | MW01, MW02, MW04, MW06, MW08             |
| kikuyu grass*                                | <i>Pennisetum clandestinum</i>                              | MW09                                     |
| lantana*                                     | <i>Lantana camara</i>                                       | MW01, MW02, MW06, MW08, MW09             |
| Leichhardt tree                              | <i>Nauclea orientalis</i>                                   | MW05                                     |
| Mackay cedar                                 | <i>Paraserianthes toona</i>                                 | MW03, MW09                               |
| mangrove                                     | <i>Avicennia marina</i>                                     | MW07                                     |
| marine couch see also salt couch, sand couch | <i>Sporobolus virginicus</i>                                | MW03, MW05, MW07                         |
| melaleuca/tea tree                           | <i>Melaleuca</i> spp.                                       | MW05, MW07                               |
| Moreton Bay ash                              | <i>Corymbia tessellaris</i>                                 | MW01, MW02, MW03, MW08                   |
| narrow-leaf mat grass*                       | <i>Axonopus affinis</i>                                     | MW09                                     |

| Common name                      | Scientific name   | Page                               |
|----------------------------------|---|------------------------------------|
| narrow-leaved ironbark           | <i>Eucalyptus crebra</i>                                    | MW02, MW04                         |
| noogoora burr*                   | <i>Xanthium occidentale</i>                                 | MW02, MW04, MW08                   |
| pandanus                         | <i>Pandanus</i> sp.   | MW05                               |
| pangola grass*                   | <i>Digitaria eriantha</i> subsp. <i>pentzii</i> cv. Pangola | MW01, MW03, MW04, MW05             |
| para grass*                      | <i>Brachiaria mutica</i>                                    | MW05, MW07                         |
| peach cedar                      | <i>Trema orientalis</i>                                     | MW03                               |
| pink bloodwood                   | <i>Corymbia intermedia</i>                                  | MW02, MW04, MW06, MW08             |
| pitted bluegrass                 | <i>Bothriochloa decipiens</i>                               | MW02, MW06, MW08                   |
| poplar gum                       | <i>Eucalyptus platyphylla</i>                               | MW02, MW06, MW08                   |
| poverty grass                    | <i>Eremochloa bimaculata</i>                                | MW04                               |
| purple top chloris               | <i>Chloris inflata</i>                                      | MW02, MW06, MW08                   |
| quandong                         | <i>Elaeocarpus grandis</i>                                  | MW09                               |
| red cedar                        | <i>Toona ciliata</i>  | MW09                               |
| red Eungella satinash            | <i>Acmena resa</i>  | MW09                               |
| red kamala                       | <i>Mallotus phillipensis</i>                                | MW03                               |
| reedgrass                        | <i>Arundinella nepalensis</i>                               | MW03, MW05                         |
| reeds                            | <i>Phragmites australis</i>                                 | MW03, MW05                         |
| Rhodes grass*                    | <i>Chloris gayana</i> cv. Callide                           | MW01, MW02, MW03, MW04, MW08, MW09 |
| rose gum                         | <i>Eucalyptus grandis</i>                                   | MW09                               |
| round leaf Wynn cassia*          | <i>Chamaecrista rotundifolia</i> cv. Wynn                   | MW02, MW06                         |
| salt water couch*                | <i>Paspalum vaginatum</i>                                   | MW03, MW05, MW07                   |
| samphire                         | <i>Halosarca indica</i>                                     | MW07                               |
| sand couch                       |   |                                    |
| salt couch see also marine couch | <i>Sporobolus virginicus</i>                                |                                    |
| scrub cherry                     | <i>Syzygium australe</i>                                    | MW09                               |
| sedges                           | <i>Cyprus</i> spp.  | MW01, MW03, MW04, MW05, MW07       |

| Common name                      | Scientific name   | Page                                  |
|----------------------------------|---|---------------------------------------|
| setaria                          | <i>Setaria sphacelata</i> var. <i>anceps</i><br>cvv. Kazungula, Nandi, Norok,<br>Solander, Splenda                                      | MW04, MW09                            |
| sicklepod                        | <i>Senna obtusifolia</i>  | MW01                                  |
| sida                             | <i>Sida</i> spp.  | MW02, MW04, MW08                      |
| signal grass*                    | <i>Brachiaria decumbens</i>   | MW01, MW02, MW03, MW04,<br>MW08       |
| snakeweed                        | <i>Stachytarpheta</i> sp.   | MW02, MW04, MW06, MW08                |
| sourgrass*                       | <i>Paspalum conjugatum</i>  | MW03, MW05                            |
| <i>Sporobolus</i> grasses        | <i>Sporobolus</i> spp.  | MW08, MW09                            |
| Stylo*                           | <i>Stylosanthes guianensis</i> var.<br><i>guianensis</i> ; <i>S. hamata</i> ; <i>S. scabra</i> ;<br><i>S. seabrana</i>                  | MW01, MW02, MW04, MW06,<br>MW08       |
| summer grass                     | <i>Digitaria ciliaris</i>   | MW01, MW02, MW06, MW08                |
| swamp mahogany                   | <i>Lophostemon suaveolens</i>   | MW03, MW08                            |
| thatch grass*                    | <i>Hyparrhenia rufa</i>   | MW01, MW02, MW04, MW08                |
| Tully grass*                     | <i>Brachiaria humidicola</i> cv. Tully  | MW01, MW02, MW03, MW04,<br>MW05, MW08 |
| urena/pink burr                  | <i>Urena</i> sp.  | MW02, MW04, MW08                      |
| <i>Vigna</i>                     | <i>Vigna</i> sp.  | MW02, MW08                            |
| water couch                      | <i>Paspalum distichum</i>   | MW03, MW05, MW07                      |
| weedy <i>Sporobolus</i> grasses* | <i>Sporobolus pyramidalis</i> , <i>S.</i><br><i>natalensis</i> , <i>S. fertilis</i> , <i>S. africanus</i> ,<br><i>S. jacquemontii</i> . | MW01, MW02, MW04, MW05,<br>MW06       |
| white cedar                      | <i>Melia azedarach</i>  | MW03, MW09                            |

\* Denotes non-native species

# Alluvial flats and plains



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|-------------------------------------|--|
| <b>Description</b>                  | Small to large creek flats that are frequently flooded.  |
| <b>Landform</b>                     | Alluvial creek flats and levees.   |
| <b>Woody vegetation</b>             | Most of these areas may have been originally rainforest with some blue gum and Moreton Bay ash. Disturbed areas tend to have regrowth of eucalypts, especially where fire is used. |
| <b>Expected pasture composition</b> | <i>Originally black speargrass and blady grass native pasture communities.</i><br>* Denotes non-native "Expected Pasture Composition" species.                                     |
| <b>Preferred</b>                    | Black speargrass, forest bluegrass, kangaroo grass, giant black speargrass.  |
| <b>Intermediate</b>                 | Bluegrasses.   |
| <b>Non-preferred</b>                | Blady grass.   |
| <b>Annual grasses</b>               | Summer grass on disturbed areas.   |
| <b>Common forbs</b>                 | Sedges.  |
| <b>Suitable sown pastures</b>       | Rhodes grass, signal grass, creeping bluegrass, pangola grass, Tully grass. Angleton grass has naturalised many lower clay soils areas. Stylo and joint-vetch.                     |
| <b>Introduced weeds</b>             | Introduced weedy <i>Sporobolus</i> grasses, including giant rat's tail (potential), sicklepod, general broad leaf weeds, thatch grass, lantana.                                    |
| <b>Soil</b>                         | Deep soil with a sandy to loam to light clay topsoil over a grey to brown sand to sandy loam to clay subsoil. The soil types include rudosols and dermosols.                       |

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| Description                                  | <b>Surface:</b> Firm; <b>Surface texture:</b> sandy to loam to light clay; <b>Subsoil texture:</b> sandy loam to light clay.  |
| Water availability                           | Moderate to high.   |
| Rooting depth                                | 1 m   |
| Fertility                                    | Moderate to high total nitrogen, moderate to high phosphorous.  |
| Salinity                                     | Low   |
| Sodicity                                     | Low   |
| pH   | Surface slightly acid to neutral; subsoil clays – acid to neutral.  |
| Utilisation                                  | 50% (sown)  |
| Enterprise                                   | Finishing   |
| Land use and management recommendations      | <ul style="list-style-type: none"> <li>• Suitable for pasture improvement (much used for cane growing).</li> <li>• Retain trees on bed and bank of streams; potential for agro-forestry.</li> <li>• Best to fence separately less fertile land types to avoid over-grazing.</li> <li>• Maintain good pasture cover to avoid erosion during flooding.</li> <li>• Use off stream watering points for cattle grazing.</li> </ul>   |
| Land use limitations                         | <ul style="list-style-type: none"> <li>• Flooding and water logging on clay soils.</li> <li>• Restricted access in wet conditions.</li> </ul>   |
| Conservation features and related management | <ul style="list-style-type: none"> <li>• The large gum trees, particularly those that are hollow bearing, provide important habitat and nesting sites for arboreal marsupials (e.g. greater gliders), raptors (e.g. boobook, barn owls, white-bellied sea eagles, kites, goshawks parrots, cockatoos). These gums trees are important food trees for koalas and greater gliders in the region.</li> <li>• Blue gum trees flower regularly and reliably, providing a major blossom and nectar source for sugar gliders, nectareous birds, fruit bats and bees.</li> <li>• Seed eating birds make use of the frontage grasses for food and shelter (e.g. manikins, finches, doves).</li> <li>• This riparian vegetation is an important corridor for migrating wildlife, often forming the only connecting corridor in the landscape.</li> <li>• These land types also provide habitat for a range of freshwater fish (e.g. Saratoga), water rats, and platypus.</li> <li>• Regeneration of blue gum forests may be encouraged by fencing off to prevent cattle from grazing seedlings.</li> <li>• Low disturbance and low usage of fire in these areas is recommended as weed infestations readily establish in flood events.</li> </ul> |
| Regional ecosystems                          | 7.3.19i, 7.3.40, 8.3.1a, 8.3.5, 8.3.6a, 8.3.10, 8.3.15.   |



# Coastal eucalypt forests and woodlands



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|-------------------------------------|--|
| <b>Description</b>                  | Gravelly and low fertility soils on hill slopes that support eucalypt woodlands (below 700 m).   |
| <b>Landform</b>                     | Undulating and low hills.  |
| <b>Woody vegetation</b>             | Narrow-leaved ironbark, grey ironbark, cabbage gum, pink bloodwood, Moreton Bay ash, poplar gum woodlands with occasional patches of broad-leaved tea tree.  |
| <b>Expected pasture composition</b> | <i>Originally black speargrass and blady grass native pasture communities.</i><br>* Denotes non-native "Expected Pasture Composition" species.   |
| <b>Preferred</b>                    | Black speargrass, some forest bluegrass, kangaroo grass.   |
| <b>Intermediate</b>                 | Pitted bluegrass, golden beard grass.  |
| <b>Non-preferred</b>                | Blady grass, purpletop chloris*.   |
| <b>Annual grasses</b>               | Summer grass.  |
| <b>Common forbs</b>                 | Low level of native legumes present ( <i>Desmodium</i> , <i>Glycine</i> , <i>Vigna</i> , <i>Alysicarpus</i> ).   |
| <b>Suitable sown pastures</b>       | Rhodes grass, green panic, signal grass, Tully grass, creeping bluegrass, Indian bluegrass, Angleton grass. Stylo, joint-vetch, round-leaf Wynn cassia.  |
| <b>Introduced weeds</b>             | Introduced weedy <i>Sporobolus</i> grasses (including giant rat's tail), lantana. General broad leaf weeds (including devil's fig, sida and flannel weed, urena/pink burr, and Noogoora burr, snakeweed), grader and thatch grass. |
| <b>Soil</b>                         | Shallow to moderately deep soil of mostly acid and intermediate volcanic rock origin. The dominate soil types are chromosol, sodosol and rudisol.  |

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| Description                                  | <b>Surface:</b> Firm to hard-setting; <b>Surface texture:</b> dark sand to loam; <b>Subsoil texture:</b> Grey to brown clay (where present).  |
| Water availability                           | Low to moderate.  |
| Rooting depth                                | 30 cm–60 cm.  |
| Fertility                                    | Low to moderate.  |
| Salinity                                     | Low to moderate (when cleared, often salinity outbreaks at foot slope).   |
| Sodicity                                     | Non-sodic to mildly sodic.  |
| pH   | Neutral to acid.  |
| Utilisation                                  | 30% (35% for sown pastures).  |
| Enterprise                                   | Breeding, growing and fattening possible in limited areas with high fertiliser inputs.  |
| Land Use and Management Recommendations      | <ul style="list-style-type: none"> <li>• Moderate to high fertiliser inputs required to maintain high productive sown pastures.</li> <li>• Woody regrowth control could be required in cleared areas.</li> <li>• Where stylo and Wynn cassia legumes are sown, careful grazing management is required to prevent legume dominance.</li> </ul>   |
| Land use limitations                         | <ul style="list-style-type: none"> <li>• Low soil phosphorous.</li> <li>• Moderate to high erosion risk.</li> </ul>   |
| Conservation features and related management | <ul style="list-style-type: none"> <li>• These land types provide important habitat for significant fauna species including northern quoll, grey goshawk, beach thick-knee, squirrel gliders, red-tail black cockatoos and orange-footed scrub fowl.</li> <li>• Use of an appropriate fire regime to maintain vegetation community and structure, including protection of standing hollow trees (alive and dead) and hollow logs on the ground is recommended.</li> </ul> |
| Regional ecosystems                          | 7.11.16a-d, 7.11.37b, 7.11.43, 7.12.12a-b, 7.12.4, 7.12.53a-e, 7.12.53g, 7.12.54a-c, 7.12.54e, 7.12.65i, 8.3.13d, 8.5.1a-b, 8.5.3a-b, 8.11.1, 8.11.4, 8.11.10, 8.12.13a-b, 8.12.13, 8.12.14a-c, 8.12.20a, 8.12.25, 8.12.26, 8.12.27a, 8.12.29, 8.12.29a-b, 11.3.32.   |



# Coastal rainforests



|                                     |  |
|-------------------------------------|--|
| <b>Description</b>                  | Upper slopes and drainage lines of low coastal hills with remnant or regenerating rainforest (elevation less than 500 m).  |
| <b>Landform</b>                     | Coastal low hills and drainage lines.  |
| <b>Woody vegetation</b>             | Rainforest (vine forest) vegetation including; white, Mackay and peach cedars, bumpy/silver ash, red kamala, forest siris. Blue gum, swamp mahogany and Moreton Bay ash occur on fringes.  |
| <b>Expected pasture composition</b> | <i>Originally sparse or absent native pasture community. Much of this land type has been developed for sugar cane and sown pastures for grazing.</i><br>* Denotes non-native "Expected Pasture Composition" species.                     |
| <b>Preferred</b>                    | Water couch, marine couch, salt water couch*.  |
| <b>Intermediate</b>                 |  |
| <b>Non-preferred</b>                | Reedgrass, sourgrass*.   |
| <b>Annual grasses</b>               | Barnyard grasses.  |
| <b>Common forbs</b>                 | Sedge. Non-preferred species include bulrushes, reeds.   |
| <b>Suitable sown pastures</b>       | Rhodes grass, signal grass, creeping bluegrass, Tully grass, pangola grass, joint-vetch, centro (climbing legume).<br>Cleared areas not planted to sown pastures, or following pasture rundown, have now been colonised by guinea grass. |
| <b>Introduced weeds</b>             | Susceptible to general broad leaf and grass weeds depending on pasture and grazing management.   |
| <b>Soil</b>                         | Shallow to moderately deep, gradational to uniform soil. Less than 0.6 m deep. The soil types include brown dermosols and chromosols.  |

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| Description                                  | <b>Surface:</b> Firm; <b>Surface texture:</b> 20–30 cm thick clay loam to light clay; <b>Subsoil texture:</b> brown to reddish-brown clay subsoil.   |
| Water availability                           | Moderate to high (55–70 mm).   |
| Rooting depth                                | 55 cm  |
| Fertility                                    | High; phosphorus levels can be variable.   |
| Salinity                                     | Low  |
| Sodicity                                     | Low  |
| pH   | Slightly acid to neutral.  |
| Utilisation                                  | 50% (sown)   |
| Enterprise                                   | Finishing  |
| Land use and management recommendations      | <ul style="list-style-type: none"> <li>• Suitable for pasture improvement (depending on topography).</li> <li>• Areas are generally used for cane growing.</li> <li>• Retain trees on bed and bank of streams, and slopes more than 20%.</li> <li>• Potential for selective removal of suitable timber trees.</li> <li>• Include fences that separate these land types from less fertile ones to avoid over-grazing.</li> <li>• Maintain good pasture cover to avoid gully erosion during high rainfall periods.</li> <li>• Use off-stream watering points for cattle grazing where possible.</li> </ul> |
| Land use limitations                         | <ul style="list-style-type: none"> <li>• Steep slopes (&lt;20%) can limit pasture development.</li> <li>• Vegetation status should be checked before development.</li> <li>• Soils can be erodible on steeper slopes.</li> </ul>   |
| Conservation features and related management | <ul style="list-style-type: none"> <li>• High conservation values where existing rainforest vegetation remains.</li> <li>• Habitat for threatened fauna including rufous owl, Proserpine rock wallaby, burrowing skink, endemic ground-dwelling lizards and endemic leaf-tail geckos.</li> <li>• There are a number of plant species that are also listed as endangered, vulnerable and rare.</li> <li>• Grazing exclusion area. Protect community edges from fire encroachment.</li> </ul>  |
| Regional ecosystems                          | 7.11.24a, 7.11.46, 7.12.10a-b, 7.12.11a-b, 7.12.11d, 7.12.1a, 7.12.1e, 7.12.2a, 7.12.39a, 7.12.40a-d, 7.12.42a-b, 7.8.11a, 7.8.1a, 7.8.1c, 8.2.14, 8.3.9, 8.8.1b, 8.11.2, 8.11.2.x1a, 8.12.11, 8.12.3a, 8.12.11a, 8.12.18, 8.12.19, 8.12.28.   |

# Coastal tea tree plains



|                                     |   |
|-------------------------------------|---|
| <b>Description</b>                  | Very low fertility, flat to undulating land with a sandy surface that supports mostly tea tree and patches of bull oak.   |
| <b>Landform</b>                     | Flat to slightly undulating coastal plains with relic terrace flats to slightly elevated peneplains.  |
| <b>Woody vegetation</b>             | Broad-leaved tea tree, pink bloodwood, narrow-leaved ironbark, cabbage palm and small areas of bull oak and grevillea. Occasionally a grasstree understorey.  |
| <b>Expected pasture composition</b> | <p><i>Originally black speargrass native pasture community, with smaller areas of blady grass and low density of native legumes.</i></p> <p><i>* Denotes non-native "Expected Pasture Composition" species.</i></p> |
| <b>Preferred</b>                    | Golden beard grass, black speargrass, kangaroo grass.   |
| <b>Intermediate</b>                 | Bluegrasses, giant black speargrass.  |
| <b>Non-preferred</b>                | Blady grass, poverty grass.   |
| <b>Annual grasses</b>               | Summer grass.   |
| <b>Common forbs</b>                 | Sedges.   |
| <b>Suitable sown pastures</b>       | Pangola grass, Tully grass, signal grass, Rhodes grass, setaria, joint-vetch, stylo, centro.  |
| <b>Introduced weeds</b>             | Introduced weedy <i>Sporobolus</i> grasses, (including giant rat's tail), broad leaf weeds (including devil's fig, sida and flannel weed, urena/pink burr, Noogoora burr, snakeweed), grader and thatch grass.      |
| <b>Soil</b>                         | Shallow to deep soil with a sandy loam topsoil over a grey to yellow clay. The dominant soil types are sodosols.  |

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|---|---|
| <b>Description</b>                                  | <b>Surface:</b> Hard-setting; <b>Surface texture:</b> Sandy to loam topsoil; <b>Subsoil texture:</b> sodic clay.  |
| <b>Water availability</b>                           | Very low to low (30–80 mm).   |
| <b>Rooting depth</b>                                | 20–60 cm.   |
| <b>Fertility</b>                                    | Very low total nitrogen, very low phosphorous, low potash.  |
| <b>Salinity</b>                                     | Low to moderate.  |
| <b>Sodicity</b>                                     | Moderate to high.   |
| <b>pH</b>   | Acid to alkaline.   |
| <b>Utilisation</b>                                  | 15% for native (30% for improved pastures).   |
| <b>Enterprise</b>                                   | Breeding and growing; finishing only possible with high fertiliser inputs.  |
| <b>Land use and management recommendations</b>      | <ul style="list-style-type: none"> <li>• Tea tree sucker regrowth can be a serious problem.</li> <li>• When developing new country, or clearing of regrowth country, it is recommended to leave clumps or strips of original vegetation, and blade plough or use Grasslan (chemical) pellet, to prevent tea tree regrowth on areas to be pastured.</li> <li>• In some areas, deep ploughing may bring sodic clay to the surface which could hinder grass growth. If ripping is chosen, only rip to 30–40 cm depth, bumper and immediately spread pasture seed to stabilise the area.</li> <li>• Tully and pangola grass recommended for low areas subject to flooding.</li> </ul>   |
| <b>Land use limitations</b>                         | <ul style="list-style-type: none"> <li>• High input costs for sown pastures.</li> <li>• Tea tree regrowth problems. In some areas the soils overlie sandstone.</li> <li>• These soils are poorly drained with summer flooding often resulting in these areas turning 'mushy' with water logging affecting pasture and causing problems for animal and vehicle movement.</li> <li>• There is a risk of soil compaction and 'debil debil' formation necessitates more frequent renovation (tillage).</li> <li>• This country is very erodible despite the lack of elevation and slope.</li> </ul>   |
| <b>Conservation features and related management</b> | <ul style="list-style-type: none"> <li>• This land type has a conservation status 'Of Concern' and a biodiversity status of 'Endangered'.</li> <li>• This vegetation type typically has a very diverse ground stratum, and many of these species remain poorly collected and known.</li> <li>• It is known habitat for the threatened fauna species – grey goshawk, beach thick-knee, eastern small-eyed snake, locally rare bar-breasted honey-eater and squirrel gliders. Also habitat for the bats and other fauna such as orange-footed scrub fowl and red-tail black cockatoos.</li> <li>• Conservative grazing regime to allow recruitment of canopy species.</li> <li>• Protect trees with hollows (living and dead) and a ground stratum with hollow logs.</li> <li>• Fencing off this area to exclude grazing during wet season will assist in controlling erosion and disturbance.</li> </ul> |
| <b>Regional ecosystems</b>                          | 8.1.5, 8.3.2, 8.3.13b, 8.5.2a, 8.5.2c, 8.5.6, 8.5.7.  |



# Coastal wetlands



|                                     |  |
|-------------------------------------|--|
| <b>Description</b>                  | Frequently flooded and often waterlogged floodplains which include swamps.   |
| <b>Landform</b>                     | Flood plains.  |
| <b>Woody vegetation</b>             | Mixed melaleuca/tea tree woodlands with occasional blue gum, Leichhardt tree, pandanus and cabbage palms.  |
| <b>Expected pasture composition</b> | <p><i>Originally blady grass and sparse or absent native pasture communities.</i></p> <p><i>Considerable areas of para grass, hymenachne and Aleman have naturalised from past plantings.</i></p> <p><i>* Denotes non-native "Expected Pasture Composition" species.</i></p> |
| <b>Preferred</b>                    | Water couch, marine couch, salt water couch*.  |
| <b>Intermediate</b>                 |  |
| <b>Non-preferred</b>                | Reedgrass, sourgrass*.   |
| <b>Annual grasses</b>               | Barnyard grasses.  |
| <b>Common forbs</b>                 | Sedge. Non-preferred species include bulrushes, reeds.   |
| <b>Suitable sown pastures</b>       | Pangola grass, Tully grass, joint-vetch.   |
| <b>Introduced weeds</b>             | Introduced weedy <i>Sporobolus</i> grasses. Environmental weeds hymenachne, para, Aleman grasses. Hymenachne is a restricted invasive plant under the <i>Biosecurity Act 2014</i> . It must not be given away, sold, or released into the environment without a permit.      |
| <b>Soil</b>                         | Deep, gradational clay soil. The main soil types include vertosols, dermosols and hydrosols.   |
| <b>Description</b>                  | <b>Surface:</b> Firm and may crack; <b>Surface texture:</b> sandy clay loam to medium clay; <b>Subsoil texture:</b> clay loam to heavy clay.   |
| <b>Water availability</b>           | Moderate to high (70–80 mm).   |
| <b>Rooting depth</b>                | >1 m (depending on depth to water table).  |



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| Fertility                                    | Moderate to high.   |
| Salinity                                     | Low to moderate.  |
| Sodicity                                     | Low to moderate.  |
| pH   | Strongly acid to alkaline.  |
| Utilisation                                  | 50% (sown)  |
| Enterprise                                   | Finishing   |
| Land use and management recommendations      | <ul style="list-style-type: none"> <li>Fence where possible to protect sensitive areas.</li> </ul>  |
| Land use limitations                         | <ul style="list-style-type: none"> <li>Flooding</li> <li>Acid sulphate soils can be present and, because of this soil hazard, professional advice should be sought before excavating in these wetland areas.</li> </ul>   |
| Conservation features and related management | <ul style="list-style-type: none"> <li>These areas provide habitats for migratory bird which are protected by international treaties.</li> <li>Important fisheries habitats may be present and should be kept free of declared and environmental weeds.</li> <li>This vegetation type typically has a very diverse ground stratum, and many of these species remain poorly collected and known. Intact (non-weedy) examples of this vegetation type are now very rare. It is known habitat for threatened plant species, e.g. black ironbox (<i>Eucalyptus raveretiana</i>).</li> <li>Some important fauna are found in this land type including rufous owl, grey goshawk, eastern small-eyed snake, azure kingfisher and the locally rare bar-breasted honey-eater.</li> <li>Larger melaleucas are likely to contain important hollows and provide seasonal food sources for birds, flying foxes and gliders. Important habitat for the greater glider particularly in drier areas. Also habitat for the red-bellied black snake and important habitat for a large variety of waterbirds, barramundi and other fauna such as the green pygmy goose and water python.</li> <li>Fencing off this area to exclude grazing permanently or exclude during wet season to assist erosion control and reduce disturbance.</li> </ul> |
| Regional ecosystems                          | 8.2.7a, 8.2.9, 8.3.3a, 8.3.4, 8.3.11, 8.3.12, 11.3.27x1c.   |

# Eucalypt hills and ranges



|                                     |   |
|-------------------------------------|---|
| <b>Description</b>                  | Moderate to steep slopes with eucalypt woodlands and forests on moderately fertile soils. Occur at an altitude higher than 700 m.   |
| <b>Landform</b>                     | Higher hills and ranges.  |
| <b>Woody vegetation</b>             | Pink bloodwood, grey ironbark, Moreton Bay ash, and scattered poplar gum.   |
| <b>Expected pasture composition</b> | <i>Originally black speargrass native pasture community.</i><br>* Denotes non-native "Expected Pasture Composition" species.  |
| Preferred                           | Black speargrass, forest bluegrass, kangaroo grass.   |
| Intermediate                        | Pitted bluegrass, golden beard grass.   |
| Non-preferred                       | Some blady grass, purpletop chloris*.   |
| Annual grasses                      | Summer grass.   |
| <b>Suitable sown pastures</b>       | Green panic, creeping bluegrass, Indian bluegrass on soils with sufficient depth. Stylo, joint-vetch, round-leaf Wynn cassia can be surface sown into less accessible and steeper areas of native pasture but can dominate native pastures. |
| <b>Introduced weeds</b>             | Introduced weedy <i>Sporobolus</i> grasses (including giant rat's tail), lantana, snakeweed and other broad leaf weeds.   |
| <b>Soil</b>                         | Shallow to moderately deep soil. The soil types are mostly brown chromosols.  |
| Description                         | <b>Surface:</b> Firm to hard-setting; <b>Surface texture:</b> sandy loam to sandy clay loam; <b>Subsoil texture:</b> clay.  |
| Water availability                  | Low to moderate (60–90 mm).   |
| Rooting depth                       | 20–50 cm  |
| Fertility                           | Low   |

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| Salinity  | May have down slope salinity issues.  |
| Sodicity  | Non-sodic to mildly sodic.  |
| pH  | Acid trend.   |
| <b>Utilisation</b>                                  | 30% (35% for sown pastures).  |
| <b>Enterprise</b>                                   | Breeding  |
| <b>Land use and management recommendations</b>      | <ul style="list-style-type: none"> <li>Limited sown pasture development possible.</li> <li>Woody regrowth control could be required in cleared areas.</li> <li>Where stylo and Wynn cassia legumes sown, careful grazing management is required to prevent native grasses being grazed out and resulting in legume dominance.</li> <li>Clearing not recommended on slopes &gt;20%.</li> </ul>   |
| <b>Land use limitations</b>                         | <ul style="list-style-type: none"> <li>Shallow soils, low soil phosphorous.</li> <li>Steep topography.</li> <li>Soils are moderately well drained but are erodible.</li> </ul>  |
| <b>Conservation features and related management</b> | <ul style="list-style-type: none"> <li>Habitat for the threatened fauna species - northern quoll, glossy black-cockatoo and squirrel glider.</li> <li>Conservative grazing regime to allow recruitment of canopy species.</li> <li>Appropriate fire regime to maintain eucalypt community.</li> <li>Protect trees with hollows (living and dead) and a ground stratum with hollow logs.</li> <li>If thinning of community, limit thinning to maintain a maximum distance of 30 m between trees.</li> </ul>  |
| <b>Regional ecosystems</b>                          | 7.11.14a-b, 7.11.19a-c, 7.11.26f, 7.11.31b-e, 7.11.33b, 7.11.35a-d, 7.11.44, 7.11.50a, 7.12.21a-d, 7.12.22a-e, 7.12.23a-e, 7.12.24a-c, 7.12.25a, 7.12.25c, 7.12.26a-f, 7.12.27b-c, 7.12.28a-b, 7.12.29b-c, 7.12.29d-f, 7.12.30a, 7.12.30c-d, 7.12.35, 7.12.37a-d, 7.12.37h-i, 7.12.54g, 7.12.57a, 7.12.57c, 7.12.58, 7.12.59, 7.12.5a-f, 7.12.61a, 7.12.65a-c, 7.12.65e, 7.12.65k, 7.12.66a-e, 8.11.12, 7.12.8.11.3a, 8.2.12a, 8.3.8, 8.9.1, 8.11.5a-b, 8.12.4, 8.12.5a, 8.12.5c, 8.12.6a-b, 8.12.9, 8.12.12a, 8.12.12d, 8.12.22, 8.12.23, 8.12.27b, 8.12.31a, 8.12.32, 9.12.2. |



# Marine plains and tidal flats



|                                     |   |
|-------------------------------------|---|
| <b>Description</b>                  | Flat land in, and adjacent to, mangrove and salt couch areas.   |
| <b>Landform</b>                     | Marine plains and tidal flats.  |
| <b>Woody vegetation</b>             | Mangrove associations, melaleuca/tea tree.  |
| <b>Expected pasture composition</b> | <i>Originally sparse or absent native pasture community.</i><br><i>* Denotes non-native "Expected Pasture Composition" species.</i> |
| Preferred                           | Salt water couch*, marine couch, water couch.   |
| Intermediate                        |   |
| Non-preferred                       |   |
| <b>Common forbs</b>                 | Samphire (preferred), fringe rush (intermediate), sedges (non-preferred).   |
| <b>Suitable sown pastures</b>       | Very limited options for sown pasture.  |
| <b>Introduced weeds</b>             | Para grass, hymenachne.   |
| <b>Soil</b>                         | Very deep cracking and non-cracking clays. The dominant soil types include hydrosols, vertosols and sodosols.                       |
| Description                         | <b>Surface:</b> Firm; <b>Surface texture:</b> Light to medium clay; <b>Subsoil texture:</b> Medium to heavy clay.                   |
| Rooting depth                       | Moderate (45 cm) for adapted plants.  |
| Fertility                           | Moderate to high total nitrogen, moderate to high phosphorous.  |
| Salinity                            | Moderate to very high.  |
| Sodicity                            | Moderate to very high.  |

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| <b>pH</b>   | Very strongly acid to alkaline.  |
| <b>Utilisation</b>                                  | 30%  |
| <b>Enterprise</b>                                   | Growing  |
| <b>Land use and management recommendations</b>      | <ul style="list-style-type: none"> <li>• Opportunistic grazing in association with less sensitive land types.</li> </ul>   |
| <b>Land use limitations</b>                         | <ul style="list-style-type: none"> <li>• There may be limitations to grazing on grazing leases below high tide mark.</li> <li>• These soils are poorly drained and have water logged subsoils.</li> <li>• Low infiltration rates except when very dry.</li> <li>• Frequently flooded.</li> <li>• Acid sulphate soils underlay most of these areas. Professional advice should be sought prior to any excavation work in these areas.</li> </ul>  |
| <b>Conservation features and related management</b> | <ul style="list-style-type: none"> <li>• Mangroves are a protected plant species.</li> <li>• Waterbirds are the most conspicuous component of the fauna of marine plains and tidal flats. These areas provide abundant food in the dense cover, and in the more open areas, for most of the major waterbird groups.</li> <li>• A key strategy for grazing management is for fencing that enables wetlands to be excluded from grazing at strategic times, particularly when their edges are soft and liable to deep plugging and when wetland plants have not yet completed the seeding stage.</li> <li>• Where exotic pasture grasses, such as para grass and hymenachne have become established, an appropriate level of grazing pressure on these grasses will be necessary to ensure they do not spread and overrun the area to the exclusion of native plants.</li> </ul> |
| <b>Regional ecosystems</b>                          | 8.1.1, 8.1.2, 8.1.3, 8.1.4.  |



# Poplar gum woodlands



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| <b>Description</b>                  | Flat to slightly undulating country which experiences occasional (one in every 10–50 years) flooding and supports eucalypt woodlands dominated by poplar gums.   |
| <b>Landform</b>                     | Terrace plains and backplains to low undulating hills.   |
| <b>Woody vegetation</b>             | Poplar gum woodlands associated with swamp mahogany, pink bloodwood, Moreton Bay ash.  |
| <b>Expected pasture composition</b> | <i>Originally black speargrass and blady grass native pasture communities. Much of this land type has been developed to cane and sown pastures.</i><br>* Denotes non-native "Expected Pasture Composition" species.          |
| Preferred                           | Black speargrass, forest bluegrass, kangaroo grass.  |
| Intermediate                        | Pitted bluegrass, golden beard grass.  |
| Non-preferred                       | Blady grass, purpletop chloris*.   |
| Annual grasses                      | Summer grass.  |
| Common forbs                        | Low level of native legumes present ( <i>Desmodium</i> , <i>Glycine</i> , <i>Vigna</i> , <i>Alysicarpus</i> ).   |
| <b>Suitable sown pastures</b>       | Rhodes grass, green panic, signal grass, Tully grass, creeping blue grass, Angleton grass. Stylo, joint-vetch.   |
| <b>Introduced weeds</b>             | Introduced weedy <i>Sporobolus</i> grasses (including giant rat's tail), lantana. General broad leaf weeds including devil's fig, sida and flannel weed, urena/pink burr, Noogoora burr, snakeweed, grader and thatch grass. |
| <b>Soil</b>                         | Deep soil. The soil types are mostly sodosols and chromosols.  |
| Description                         | <b>Surface:</b> Hard-setting; <b>Surface texture:</b> sandy to loam; <b>Subsoil texture:</b> grey to brown clay.   |
| Water availability                  | Low to moderate (60–9 mm).   |
| Rooting depth                       | 30–60 cm   |

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| <b>Fertility</b>                                    | Low to moderate.   |
| <b>Salinity</b>                                     | Low to moderate.   |
| <b>Sodicity</b>                                     | Non sodic to mildly sodic.   |
| <b>pH</b>   | Subsoil is acid to alkaline.   |
| <b>Utilisation</b>                                  | 30% (35% for sown pastures).   |
| <b>Enterprise</b>                                   | Breeding and growing, with fattening possible in limited areas with high fertiliser inputs.  |
| <b>Land use and management recommendations</b>      | <ul style="list-style-type: none"> <li>• Moderate to high fertiliser inputs to maintain high productive sown pastures.</li> <li>• Woody regrowth control could be required in areas cleared for pasture.</li> <li>• Where stylo is over sown into native pasture use grazing management (spelling) or fire to avoid legume dominance.</li> </ul>   |
| <b>Land use limitations</b>                         | <ul style="list-style-type: none"> <li>• Low soil phosphorous.</li> <li>• Soils are moderate to poor drainage.</li> </ul>  |
| <b>Conservation features and related management</b> | <ul style="list-style-type: none"> <li>• Conservation rating "Of Concern" and a biodiversity rating "Endangered".</li> <li>• A diverse vegetation unit which has been poorly surveyed for flora and fauna.</li> <li>• Significant fauna species include the black-chinned honeyeater, koala and squirrel glider.</li> <li>• Conservative grazing regime to allow recruitment of canopy species.</li> <li>• Appropriate fire regime to maintain eucalypt community.</li> <li>• Protect trees with hollows (living and dead) and a ground stratum with hollow logs.</li> <li>• If thinning of community, limit thinning to maintain a maximum distance of 30 m between trees.</li> </ul> |
| <b>Regional ecosystems</b>                          | 7.3.16a-c , 7.11.20.   |

# Wet highland rainforests



|                                     |   |
|-------------------------------------|---|
| <b>Description</b>                  | Rainforest on steeper areas of Clarke range with an elevation more than 700 m.  |
| <b>Landform</b>                     | High hills and steep slopes.  |
| <b>Woody vegetation</b>             | Rainforest vegetation including red, white and Mackay cedars, hoop pine, red Eungella satinash, scrub cherry, black tulip oak, quandong. On the fringes flooded or rose gums occur.                     |
| <b>Expected pasture composition</b> | <p><i>Originally sparse or absent native pasture community, considerable areas developed for dairy farms post 1940s.</i></p> <p><i>* Denotes non-native "Expected Pasture Composition" species.</i></p> |
| Preferred                           |   |
| Intermediate                        |   |
| Non-preferred                       | Narrow-leaf mat grass* has naturalised following fertility rundown post clearing.   |
| <b>Suitable sown pastures</b>       | Rhodes grass, setaria grasses, kikuyu grass, clovers, creeping vigna (legume).  |
| <b>Introduced weeds</b>             | Introduced weedy <i>Sporobolus</i> grasses (e.g. giant rat's tail), lantana. Susceptible to general broad leaf and grass weeds depending on pasture and grazing management.                             |
| <b>Soil</b>                         | Moderately deep to deep, gradational soil with clay loam topsoil over reddish brown subsoil. The main soil type is dermosols.   |
| Description                         | <b>Surface:</b> Hard-setting to firm; <b>Surface texture:</b> dark loam to clay; <b>Subsoil texture:</b> red clay.  |
| Water availability                  | Moderate to high.   |



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| Rooting depth                                       | 0.5–1 m.   |
| Fertility   | Quick rundown once rainforest cleared.   |
| Salinity  | Low  |
| Sodicity  | Low  |
| pH  | Acid trend.  |
| <b>Utilisation</b>                                  | 50% (sown)   |
| <b>Enterprise</b>                                   | Initially developed for dairy farms. Currently breeding and finishing with fertiliser inputs.  |
| <b>Land use and management recommendations</b>      | <ul style="list-style-type: none"> <li>• High input of fertiliser to maintain sown pastures.</li> <li>• Need to be vigilant with lantana control.</li> <li>• Suitable for pasture improvement (depending on topography).</li> <li>• Retain trees on bed and bank of streams.</li> <li>• Selective logging of timber trees could be possible, if undertaken in accordance with State Forestry and vegetation management policies and guidelines.</li> <li>• Maintain good pasture cover to avoid erosion during high rainfall periods.</li> <li>• Use off stream watering points for cattle grazing where possible.</li> </ul>  |
| <b>Land use limitations</b>                         | <ul style="list-style-type: none"> <li>• Steep slopes (&lt;15–20%) can limit pasture development.</li> <li>• Tree vegetation status should be checked before development.</li> <li>• Pasture rundown is relatively quick after clearing (5 years).</li> </ul>  |
| <b>Conservation features and related management</b> | <ul style="list-style-type: none"> <li>• Very high conservation values where existing rainforest vegetation remains.</li> <li>• Habitat for threatened fauna species including rufous owl, Eungella honeyeater, Proserpine rock wallaby, Eungella day frog and Eungella tinkler frog, skink and endemic leaf-tail geckos. The light colour form of the southern boobook owl is of locally significant conservation value. Also habitat for the red-bellied black snake and eastern small-eyed snake.</li> <li>• Isolation of remnants over time has resulted in speciation within distinct rainforest types.</li> <li>• Grazing exclusion area. Protect community edges from fire encroachment.</li> </ul> |
| <b>Regional ecosystems</b>                          | 7.11.12a-b, 7.11.12f, 7.11.1a-b, 7.11.1f, 7.11.29a, 7.11.30, 7.11.7d, 7.12.16a-b, 7.12.17, 7.12.1b, 7.12.64a-e, 7.12.68, 7.12.7a-b, 7.12.9, 7.8.13, 7.8.14, 7.8.2a-c, 7.8.3a, 7.8.4a-d, 8.8.1a, 8.12.1a-b, 8.12.2, 8.12.3b, 8.12.17a, 8.12.17c, 8.12.30.   |