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BIODIVERSITY CONSERVATION ACT 2016

BIODIVERSITY CONSERVATION (THREATENED ECOLOGICAL COMMUNITIES) ORDER 2023

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BIODIVERSITY CONSERVATION (THREATENED ECOLOGICAL COMMUNITIES) ORDER 2023

Made by the Minister under section 27(1) of the Act.

1. Citation

This order is the Biodiversity Conservation (Threatened Ecological Communities) Order 2023.

2. Commencement

This order comes into operation as follows—

(a) clauses 1 and 2—on the day on which this order is published in the *Gazette*;

(b) the rest of the order—on the day after that day.

3. Threatened ecological communities

(1) Each ecological community specified in Schedule 1 Division 1 is listed as a threatened ecological community in the category of critically endangered ecological community.

(2) Each ecological community specified in Schedule 1 Division 2 is listed as a threatened ecological community in the category of endangered ecological community.

(3) Each ecological community specified in Schedule 1 Division 3 is listed as a threatened ecological community in the category of vulnerable ecological community.

SCHEDULE 1—THREATENED ECOLOGICAL COMMUNITIES

Division 1—Critically endangered ecological communities

Item	Ecological community	Summary description
1	Aquatic Root Mat Community Number 1 of Caves of the Leeuwin-Naturaliste Ridge (Easter and Jewel Caves)	The community occurs in the cave system of the Leeuwin-Naturaliste Ridge incorporating Easter and Jewel Caves. It comprises a complete food web. Rootlets and their associated microflora provide the primary food source, and root mat grazers, predators, parasites, detritivores and scavengers complete the interactions. The root mats are produced by *Eucalyptus diversicolor* (karri). Aquatic cavernicoles (cave animals) in the community include crustaceans (Amphipoda, Copepoda, Ostracoda) and worms (Oligochaeta). The ostracod *Acandona admiratio* Karanovic 2003 is specific to Jewel and Easter Caves. The community was originally described in Jasinska E.J. (1997) *Faunae of aquatic root mats in caves of southwestern Australia: origins and ecology* (unpublished doctoral thesis, The University of Western Australia).
2	Aquatic Root Mat Community Number 1 of Caves of the Swan Coastal Plain	The community occurs in caves at sites that include Yanchep National Park and surrounds. It comprises root mats of *Eucalyptus gomphocephala* (tuart) supported by groundwater fed streams and pools that occur in the caves. The root mats support a highly diverse and distinctive assemblage of cave fauna including the critically endangered cave shrimp *Hurleya* sp. (WAM 23193; Crystal Cave crangonyctoid).
3	Aquatic Root Mat Community Number 2 of Caves of the Leeuwin-Naturaliste Ridge (Strongs Cave)	The community occurs in the cave system of the Leeuwin-Naturaliste Ridge incorporating Strongs Cave. It comprises a complete food web. Rootlets and their associated microflora provide the primary food source, and root mat grazers, predators, parasites, detritivores and scavengers complete the interactions. The root mats are produced by *Eucalyptus diversicolor* (karri). Aquatic cavernicoles (cave animals) in the community include crustaceans (Amphipoda, Copepoda, Syncarida) and worms (Oligochaeta, Turbellaria, Nematoda). The copepod Harpacticoida Family indet. and turbellarian *Macrostomum* sp. 4 (Jasinska 1997) are specific to Strongs Cave. The community was originally described in Jasinska E.J. (1997) *Faunae of aquatic root mats in caves of southwestern Australia: origins and ecology* (unpublished doctoral thesis, The University of Western Australia).
4	Aquatic Root Mat Community Number 3 of Caves of the Leeuwin-Naturaliste Ridge (Kudjal Yolgah and Budjur Mar Caves)	The community occurs in the cave system of the Leeuwin-Naturaliste Ridge, incorporating Kudjal Yolgah and Budjur Mar Caves. It comprises a complete food web. Rootlets and their associated microflora provide the primary food source, and root mat grazers, predators, parasites, detritivores and scavengers complete the interactions. The root mats are produced by *Eucalyptus diversicolor* (karri) and *Agonis flexuosa* (peppermint). Aquatic cavernicoles (cave animals) in the community include crustaceans (Copepoda, Syncarida), a mite (Oribatida), worms (Oligochaeta), a tardigrade (Eutardigrada) and insects (Coleoptera, Diptera). The Acarina, Oribatida sp. 6 (Jasinska 1997), the oligochaetes *Aeolosoma* sp., Enchytraeidae sp. 5, Enchytraeidae sp. 6, Phreodrilidae WA25 sp. n., the copepod '*Kudjalmoraria nana*' n.g., n.sp. Karanovic in prep., the coleopteran Helodidae sp. indet., the turbellarians *Alloeocoela*

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		sp. 1 (Jasinska 1997) and *Stenostomum* sp. 3 (Jasinska 1997) are specific to the community. The community was originally described in Jasinska E.J. (1997) *Faunae of aquatic root mats in caves of southwestern Australia: origins and ecology* (unpublished doctoral thesis, The University of Western Australia).
5	Aquatic Root Mat Community Number 4 of Caves of the Leeuwin-Naturaliste Ridge (Calgardup Cave)	The community occurs in the cave system of the Leeuwin-Naturaliste Ridge incorporating Calgardup Cave. It comprises a complete food web. Rootlets and their associated microflora provide the primary food source, and root mat grazers, predators, parasites, detritivores and scavengers complete the interactions. The root mats are produced by *Corymbia calophylla* (marri). Aquatic cavernicoles (cave animals) in the community include *Cherax preissii* (koonac), other crustaceans (*Perthia acutitelson, Paracyclops, Harpacticoida*), meiobenthic mites (*Soldanellonyx monardi* and *Oribatida*), non-biting midges (*Chironomus* aff. *alternans* Walker, *Polypedilum* sp.), rotifers (*Rotifera*) and microscopic worms (*Stenostomum* sp.). The community was originally described in Jasinska E.J. (1997) *Faunae of aquatic root mats in caves of southwestern Australia: origins and ecology* (unpublished doctoral thesis, The University of Western Australia).
6	Assemblages of Big Springs organic mound springs	The known occurrence of the community comprises a complex system of freshwater seepages and peaty springs with internal moats with broad tidal flats on the seaward margin and cracking clay flats on the landward margin. It occurs in the West Kimberley. A further feature is the scattered clusters of small outlying, densely vegetated mound springs. The main seepage area supports well developed rainforest vegetation dominated by forests of *Terminalia microcarpa* (damson plum). Several mistletoe species (Loranthaceae) have been recorded in the *Terminalia* canopy, which reaches 20m in places. Other trees present include *Ficus racemosa* (cluster fig), *Ficus virens* (banyan fig), *Melaleuca leucadendra* (weeping paperbark), *Pandanus* sp. (screwpines), *Sesbania formosa* (white dragon tree) and *Timonius timon*. Much less common species noted were *Antidesma ghaesembilla* (yangu), *Diospyros maritima* and *Nauclea orientalis* (Leichhardt tree). The understorey varies from central open glades with turf of Cyperaceae to pure leaf litter under the *Terminalia* canopies. Internal moats support *Acrostichum speciosum* (mangrove fern). The outer perimeter of the large seepage feature is relatively dry in most places with this ring generally dominated by dense thickets of *Melaleuca alsophila* or *Acacia ampliceps* (or both) with scattered *Lysiphyllum cunninghamii, Dichrostachys spicata* (Chinese lantern) and occasional *Adansonia gregorii* (boab) of small stature. Outlying mound spring islands on tidal flats vary markedly in size and in the diversity of vegetation. Some of the smallest islands consist solely of *Typha domingensis* (bulrush). Larger examples often feature *Pandanus spiralis, Sesbania formosa, Acacia neurocarpa* and occasionally *Terminalia microcarpa* and *Ficus* sp. (fig), with a range of Cyperaceae. Several islands were noted with unusual associations such as *Typha* sp. growing with the mangrove *Lumnitzera* sp. The permanent groundwater discharge from the springs provides aquatic habitats (pools and seepages, plus the saturated peat itself) that support distinct assemblages of aquatic invertebrates, often with stygal and restricted elements. The mesic environment in these springs probably also support distinct terrestrial invertebrate fauna assemblages.
7	Assemblages of Bunda Bunda organic mound springs	The community comprises a complex system of organic mound springs on tidal mudflats in Carnot Bay on the Dampier Peninsula north of Broome. Peaty mounds rise 2–3 m above the surrounding tidal flats and are composed of accumulated leaf litter and living vegetation, supporting a dense closed rainforest and tall shrubland, with mangroves forming a concentriform on the surrounding mudflats. The smaller mound is dry in the centre but encircled by a moat, fed by permanent freshwater seepage. The larger mound is wet and incompletely enclosed by a very fine scale channel or moat of variable depth, which broadens to a microscale saline lake on the north side. The moats and pools are saline and occasionally inundated during large tides. The western end of the large mound is covered by a very dense closed forest dominated by evergreen *Carallia brachiata* trees and a bracken-like layer of the fern *Cyclosorus interruptus* (swamp shield-fern). *Timonius timon* and *Sesbania formosa* (white dragon tree) also occur. The eastern portion of the mound is covered by tall closed forest of *Melaleuca cajuputi, Timonius timon, Sesbania formosa* with fewer *Carallia brachiata* with an understorey of *Cyclosorus interruptus*. Climbers including *Cassytha filiformis* (love vine) and *Secamone elliptica* drape from trees with ferns *Lygodium microphyllum* (climbing maidenhair) forming a curtain. A moat-like

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		channel surrounding the large mound contains mangroves, predominantly *Rhizophora stylosa* (spotted-leaved red mangrove) and *Avicennia marina* (white mangrove) with *Acrostichum speciosum* (mangrove fern).
8	Assemblages of Dragon Tree Soak organic mound spring	The community occurs in the Great Sandy Desert bioregion and is a wetland landform supporting plants and animals that are absent or scarce elsewhere in the bioregion. At its centre, the community comprises a closed sedgeland of jointed twig-rush *Machaerina articulata* to 2.5m high and 95% cover. *Sesbania formosa* (white dragon tree) occurs as a sparse emergent and some clumps of *Typha domingensis* (bulrush) are also present in the centre of the soak. At the southern and northern ends of the wetland is a low closed forest or scrub of *Sesbania formosa*, averaging 10m in height, with some *Typha domingensis* understorey. In wet areas on the periphery of the wetland, a grassland of *Paspalum vaginatum* (saltwater couch) occurs, with sparse emergent *Fimbristylis ferruginea*. The slightly higher and drier surrounding flats support *Sporobolus virginicus* (marine couch), *Acacia ampliceps* and *Melaleuca glomerata*. The priority 3 sedge species *Fimbristylis sieberiana* also occurs.
9	Assemblages of the organic mound springs of the Three Springs area	The community occurs in the Three Springs area. The mound spring habitat is characterised by continuous discharge of groundwater in raised areas of peat. The peat and surrounds provide a stable, permanently moist series of microhabitats. There is a high level of heterogeneity of invertebrate fauna assemblages between occurrences, and all are associated with a rich and healthy fauna. The distinctive assemblages are composed of invertebrate groups commonly including beetles, oligochaetes, non-biting midges and bugs. The vegetation component of the community contains many moisture-loving species including an overstorey of *Melaleuca preissiana* (moonah) trees. *Eucalyptus camaldulensis* (river red gum) and *Eucalyptus rudis* (flooded gum) are also found in a number of the mound springs. The shrub layer often includes *Hypocalymma angustifolium* (white myrtle) and *Acacia saligna* (orange wattle) over *Machaerina vaginalis* (sheath twigrush) and other sedges. The herbaceous *Patersonia occidentalis* (purple flag, swamp variant) has been recorded at several occurrences.
10	Assemblages of the organic springs and mound springs of the Mandora Marsh area	The community occurs in the Mandora Marsh area, which is located 140km south-west of Broome and approximately 40–100km inland from Eighty Mile Beach. Plant assemblages associated with the springs include paperbark *Melaleuca leucadendra* or *Melaleuca cajuputi* forest and *Sesbania formosa* (white dragon tree) woodland, with or without an understorey of *Acrostichum speciosum* (mangrove fern). Stands of the bulrush *Typha domingensis* and sedgelands dominated by *Schoenoplectus* spp. with *Fimbristylis* spp., along with patches of the grass *Sporobolus virginicus* (marine couch) also occur. In addition, a few *Avicennia marina* (white mangroves) occur on the more brackish springs. *Acacia ampliceps* is often present in the mid-storey but is not abundant. *Typha domingensis* (bulrush) and sedges with a few emergent trees or mangroves dominate the vegetation on some of the small mound springs. The dominant vegetation of the springs varies between occurrences and over time due to damage by cyclonic winds. Invertebrate fauna from mound springs of the Mandora Marsh area are much richer than in springs further north in the Kimberley, and very few species are common to both areas. The permanent water and dense vegetation of the springs provide a refuge for fauna within an otherwise arid desert landscape.
11	*Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson et al. 1994)	The community is found on a range of soil and landform units at the base of the Darling Scarp that are described in Churchward and McArthur (1978) *The landforms and soils of the Darling System* (Division of Land Resources Management, CSIRO, Perth, Western Australia). The community occurs largely on the Forrestfield unit (Ridge Hill Shelf), Guildford unit or at the confluence of Guildford with Forrestfield, but also occurs on the Southern River unit. The community is generally very species rich. Most occurrences of this community type are *Eucalyptus marginata—Banksia attenuata* woodlands but *Banksia* woodlands and heaths are also found, with *Mesomelaena pseudostygia*, *Morelotia octandra*, *Banksia dallanneyi* (couch honeypot), *Desmocladus fasciculatus*, and *Chamaescilla corymbosa* (blue squill) being common in the understorey. The community is also known as 'floristic community type 20b' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and

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12	*Banksia attenuata* woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. 1994)	The community has been recorded from sands near Koondoola and Banksia Grove, and at the base of the Darling Scarp between Wannamal and Maddington. This community is generally very species rich. It is usually dominated by *Banksia attenuata* (slender banksia), occasionally with *Eucalyptus marginata* (jarrah) with *Bossiaea eriocarpa* (common brown pea), *Conostephium pendulum* (pearl flower), *Hibbertia huegelii, Hibbertia hypericoides* (yellow buttercups), *Petrophile linearis* (pixie mops), *Scaevola repens, Stirlingia latifolia* (blueboy), *Mesomelaena pseudostygia* and *Alexgeorgea nitens* being common in the understorey. The community is also known as 'floristic community type 20a' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
13	Black Spring organic mound spring community	The community occurs in the East Kimberley and the known occurrence consists of a raised central mound supporting a forest of *Melaleuca viridiflora* (broadleaf paperbark), *Ficus* spp., *Timonius timon* and *Pandanus spiralis* (screwpine) over *Colocasia esculenta* (taro) and ferns, including *Cyclosorus interruptus* (swamp shield-fern). The tall *Phragmites karka* (tropical reed) dominates the outer edge of the mound and the entire mound is ringed by a moat of water supporting sedges and grasses. The springs contain a rich assemblage of aquatic invertebrate fauna. The community consists of raised peaty soaks or wetlands that occur on saturated peaty black clay soil with high organic content.
14	*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands of the Swan Coastal Plain (floristic community type 30a as originally described in Gibson et al. 1994)	The community is located on calcareous sandy soils of the Quindalup Dunes generally occurring between Trigg and Point Peron and on the Swan River in Peppermint Grove. The community also occurs on Garden Island and Rottnest Island. Typical and common native taxa in the community are: *Callitris preissii* (Rottnest Island pine), *Melaleuca lanceolata* (Rottnest teatree), *Spyridium globulosum* (basket bush), *Acanthocarpus preissii, Rhagodia baccata* (berry saltbush), *Austrostipa flavescens* and *Trachymene pilosa* (native parsnip). The community is also known as 'floristic community type 30a' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
15	Camerons Cave Troglobitic Community	The community is known from Camerons Cave on the Cape Range peninsula. It comprises a unique assemblage of species, at least eight of which are known only from this location. The threatened species *Stygiochiropus peculiaris* (Camerons Cave millipede; critically endangered) and *Indohya damocles* (Camerons Cave pseudoscorpion; critically endangered) (previously *Hyella* sp. BES 1154.2525, 1546, 2554) are endemic to Camerons Cave. *Milyeringa veritas* (blind gudgeon; vulnerable) and *Draculoides bramstokeri* (Barrow Island draculoides; vulnerable) also occur in the cave.
16	Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain)	The community occurs in tumulus springs (organic mound springs) on the Swan Coastal Plain. The habitat of the mound springs is characterised by continuous discharge of groundwater in raised areas of peat. The peat and surrounds provide a stable, permanently moist series of microhabitats, with a high level of heterogeneity of invertebrate fauna assemblages between sites. Groups commonly represented include Ostracoda, Nematoda, Cladocera, Copepoda, Oligochaeta, Tardigrada, Turbellaria and Insecta. Typical and common native vascular plant species associated with the tumulus springs are the trees *Banksia littoralis* (swamp banksia), *Melaleuca preissiana* (moonah) and *Eucalyptus rudis* (flooded gum), and the shrubs *Taxandria linearifolia* (swamp peppermint), *Pteridium esculentum* (bracken fern), *Astartea scoparia* (common astartea) and *Cyclosorus interruptus* (swamp shield-fern).
17	*Corymbia calophylla—Kingia australis* woodlands on heavy soils (floristic community type	The community has been recorded from heavy soils of the eastern side of the southern Swan Coastal Plain largely between Capel and Chittering. Typical native taxa in the community are the tree *Corymbia calophylla* (marri), the shrubs *Banksia dallanneyi* (couch honeypot), *Philotheca spicata* (pepper and salt), *Kingia australis* (kingia) and *Xanthorrhoea preissii* (balga), and the herbs, rushes and sedges *Cyathochaeta avenacea, Dampiera linearis* (common dampiera), *Haemodorum laxum,*

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	3a as originally described in Gibson et al. 1994)	*Desmocladus fasciculatus*, *Mesomelaena tetragona* (semaphore sedge) and *Morelotia octandra*. The community is also known as 'floristic community type 3a' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
18	*Corymbia calophylla* woodlands on heavy soils of the southern Swan Coastal Plain (floristic community type 1b as originally described in Gibson et al. 1994)	The community has been recorded from heavy fertile soils of the southern Swan Coastal Plain south of Dardanup. It consists largely of *Corymbia calophylla* (marri) forests and woodlands. *Eucalyptus marginata* (jarrah) is also common in the tree layer. Common understorey species include *Acacia extensa* (wiry wattle), *Gompholobium polymorphum*, *Billardiera variifolia*, *Hibbertia hypericoides* (yellow buttercups), *Hypocalymma angustifolium* (white myrtle) and *Xanthorrhoea preissii* (balga) over a rich herb layer including *Scaevola calliptera*, *Agrostocrinum scabrum* (blue grass lily), *Austrostipa semibarbata*, *Dampiera linearis* (common dampiera), *Mesomelaena tetragona* (semaphore sedge), *Morelotia octandra* and *Lomandra purpurea* (purple mat rush). The community is also known as 'floristic community type 1b' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
19	Ethel Gorge aquifer stygobiont community	The community is known from the Ethel Gorge (Ophthalmia Basin) alluvium calcrete aquifer on the Fortescue River in the vicinity of the town of Newman. It comprises a diverse assemblage of stygofaunal species. It includes Oligochaeta and the crustaceans Bathynellacea (Syncarida), cyclopoid and harpacticoid copepods, Candonidae: Candoninae C (Ostracoda: Podocopida), Candonidae: Candoninae D (Ostracoda: Podocopida), Limnocytheridae (Ostracoda: Podocopida), flabelliferan Isopod (Tainisopidae) and one new genus of Crangonyctoid amphipoda (*Chydaekata*, family Paramelitidae), in which 14 species (13 in this aquifer) have been described on morphological characters. At least one species of *Chydaekata* is known only from this community.
20	Ferricrete floristic community (Rocky Springs type)	The community comprises tall shrubland and has been recorded between Arrino and Eneabba, on irregularly inundated red brown sandy loams over ferricrete. It is generally dominated by *Acacia blakelyi*, *Allocasuarina campestris* and *Labichea lanceolata* subsp. *lanceolata*. Associated species include *Alyogyne hakeifolia*, *Borya sphaerocephala*, *Isotoma hypocrateriformis* (Woodbridge poison), *Petrophile seminuda*, *Stylidium dichotomum* (pins-and-needles), *Thysanotus patersonii* and *Pterochaeta paniculata* (woolly waitzia).
21	Forests and woodlands of deep seasonal wetlands of the Swan Coastal Plain (floristic community type 15 as originally described in Gibson et al. 1994)	The community has been recorded from Bambun to Nirimba, on alluvial sediments on sites that are inundated for long periods resulting in more typical aquatic and flora of deeper wetlands. The community is generally dominated by *Melaleuca rhaphiophylla* (swamp paperbark) or *Casuarina obesa* (swamp sheoak). Other species can include *Melaleuca teretifolia* (banbar), *Atriplex cinerea* (grey saltbush), *Samolus repens* (creeping brookweed), *Salicornia quinqueflora* (beaded samphire) and *Sporobolus virginicus* (marine couch). The community is also known as 'floristic community type 15' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
22	Koolanooka System as originally described in Beard (1976)	This community is known from the Koolanooka Hills, its footslopes and the Perenjori Hills. It comprises *Eucalyptus ebbanoensis* subsp. *ebbanoensis* mallee and *Acacia* sp. scrub with scattered *Allocasuarina huegeliana* (rock sheoak) over red loam and ironstone on the upper slopes and summits, *Allocasuarina campestris* scrub over red loam on hill slopes, shrubs and emergent mallees on shallow red loam over massive ironstone on steep rocky slopes, *Eucalyptus loxophleba* (York gum) woodland over scrub on the footslopes, and mixed *Acacia* sp. scrub on granite. The community was originally described in Beard J.S. (1976) *The vegetation of the Perenjori area, Western Australia: Map and explanatory memoir* (1:250,000 vegetation series, Vegmap Publications, Perth, Western Australia).

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23	Lesueur-Coomallo floristic community A1.2 as originally described by Griffin and Hopkins (1990)	The community is known from Warradarge. It comprises a species-rich heath with emergent *Hakea obliqua* (needles and corks) on sand with faithful species of *Hakea obliqua* and *Beaufortia elegans* (elegant beaufortia) and constant species of *Dasypogon bromeliifolius* (pineapple bush) and *Stirlingia latifolia* (blueboy) over well-drained grey sand over pale yellow sand on lateritic uplands. Associated species include *Allocasuarina humilis* (dwarf sheoak), *Calothamnus sanguineus* (silky-leaved blood flower), *Hibbertia hypericoides* (yellow buttercups), *Hypocalymma xanthopetalum*, and *Schoenus subflavus* (yellow bog-rush). The community was originally described by Griffin E.A. and Hopkins A.J.M. in the vegetation chapter (pp. 25–38) in A.A. Burbidge, S.D. Hopper and S. van Leeuwen (Eds.) (1990) *Nature conservation, landscape and recreation values of the Lesueur area* (a report to the Environmental Protection Authority from the Department of Conservation and Land Management. Bulletin 424, Environmental Protection Authority, Perth).
24	Lesueur-Coomallo floristic community D1 as originally described by Griffin and Hopkins (1990)	The community occurs in Hill River. It comprises a species-rich low heath on moderately to well-drained lateritic gravels on lower slopes and low rises, dominated by *Allocasuarina microstachya* with *Allocasuarina ramosissima* (priority 3), *Allocasuarina humilis* (dwarf sheoak), *Babingtonia grandiflora* (large-flowered babingtonia), *Borya nitida* (pincushions), *Calytrix flavescens* (summer starflower), *Calothamnus sanguineus* (silky-leaved blood flower), *Conostylis androstemma* (trumpets), *Cryptandra pungens*, *Banksia armata* (prickly dryandra), *Gastrolobium polystachyum* (horned poison), *Hakea auriculata*, *Hakea incrassata* (marble hakea), *Hakea erinacea*, *Hibbertia hypericoides* (yellow buttercups), *Hypocalymma xanthopetalum*, *Melaleuca trichophylla*, *Petrophile chrysantha*, *Schoenus subflavus* (yellow bog-rush) and *Xanthorrhoea drummondii*. The community was originally described by Griffin E.A. and Hopkins A.J.M. in the vegetation chapter (pp. 25–38) in A.A. Burbidge, S.D. Hopper and S. van Leeuwen (Eds.) (1990) *Nature conservation, landscape and recreation values of the Lesueur area* (a report to the Environmental Protection Authority from the Department of Conservation and Land Management. Bulletin 424, Environmental Protection Authority, Perth).
25	*Melaleuca huegelii—M. systena* shrublands of limestone ridges (floristic community type 26a as originally described in Gibson et al. 1994)	The community is known from shallow soils over limestone or massive limestone ridges of Tamala Limestone between Yanchep north of Perth, and south of Perth near Lake Clifton. The community generally comprises species-rich thickets, heaths and scrubs dominated by *Melaleuca huegelii* (chenille honeymyrtle), *Melaleuca systena* (coastal honeymyrtle) and *Banksia sessilis* (parrot bush), commonly over *Grevillea preissii* (spider net grevillea), *Spyridium globulosum* (basket bush), and *Acacia lasiocarpa* (pajang). A suite of herbs commonly occurs under the shrub layer. The community is also known as 'floristic community type 26a' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
26	Montane Heath and Thicket of the Eastern Stirling Range	The community occurs in the high peaks of the eastern Stirling Range mountains. It is commonly found at altitudes of approximately 900–1090m above sea level, but extends to lower altitudes in two occurrences. It comprises a heathland and dense shrub thicket with a number of endemic species. Several endemic and characteristic species within the community and the near absence of *Eucalyptus* species differentiate it from other plant communities in the range. Thirteen species of threatened flora are known in the community: *Andersonia axilliflora* (giant andersonia; critically endangered), *Banksia brownii* (feather-leaved banksia; critically endangered), *Banksia montana* (critically endangered), *Darwinia collina* (yellow mountain bell; critically endangered), *Darwinia nubigena* (endangered), *Darwinia squarrosa* (pink mountain bell; vulnerable), *Daviesia obovata* (endangered), *Deyeuxia drummondii* (Drummond grass; vulnerable), *Lambertia fairallii* (Fairall's honeysuckle; critically endangered), *Latrobea colophona* (critically endangered), *Leucopogon gnaphalioides* (critically endangered), *Persoonia micranthera* (critically endangered) and *Sphenotoma drummondii* (mountain paper-heath; endangered). Twenty three priority flora taxa also occur in the community. *Andersonia axilliflora* is a characteristic endemic species of the community. Five threatened and one priority fauna species occur within the community: *Setonix brachyurus* (quokka; vulnerable), *Pseudococcus markharveyi* (*Banksia montana* mealybug; critically endangered), *Trioza barrettae*

Item	Ecological community	Summary description
		(*Banksia brownii* plant-louse; endangered), *Zephyrarchaea robinsi* (eastern massif assassin spider; vulnerable), *Atelomastix tumula* (Bluff Knoll atelomastix millipede; vulnerable), and *Bothriembryon glauerti* (a bothriembryontid land snail; priority 2).
27	Mt Lindesay—Little Lindesay Vegetation Complex	The community is known from Mount Lindesay and Little Lindesay. It comprises a unique combination of restricted flora including granite specialists. The granite complex also contains threatened flora and priority flora taxa. *Eucalyptus marginata* (jarrah), shrub-mallee and heath predominate the upper slopes and summit area with *Eucalyptus marginata*, *Corymbia calophylla* (marri) and *Eucalyptus megacarpa* (bullich) low woodland in gullies. Soils are shallow or skeletal. In these areas, typical shrubs include *Banksia grandis* (bull banksia), *Hakea varia* (variable-leaved hakea) and *Beaufortia decussata* (gravel bottlebrush), with the sedge *Mesomelaena graciliceps*. Other shrubs include *Sphenotoma parviflora*, *Gastrolobium brownii* and *Billardiera drummondii*. Three priority taxa of *Andersonia—Andersonia hammersleyana* (priority 2), *Andersonia* sp. Mitchell River (B.G. Hammersley 925; priority 3) and *Andersonia* sp. Virolens (G.J. Keighery 12000; priority 3) are found in the community. Relatively bare granite rock slabs dominate the middle slopes and support a unique community of scrub and open herbs including two species listed as vulnerable (*Grevillea fuscolutea* and *Laxmannia grandiflora* subsp. *brendae*) and four priority flora (*Borya longiscapa* (priority 3), *Cryptandra congesta* (priority 4), *Lasiopetalum* sp. Denmark (B.G. Hammersley 2012; priority 3) and *Sphenotoma* sp. Stirling Range (P.G. Wilson 4235; priority 4)). Additional non-endemic flora include *Drakaea micrantha* (endangered) and *Eucalyptus virginea* (Mount Lindesay white gum; priority 4) with granite associates *Calothamnus scabridus* (priority 2) and *Verticordia endlicheriana* var. *angustifolia* (priority 3).
28	Organic mound spring sedgeland community of the North Kimberley bioregion	Occurrences of this community are centred on mound spring habitat in the North Kimberley bioregion. The community is comprised of sedgelands and grasslands that are almost completely devoid of trees and shrubs due to a waterlogged seepage zone and can also include boggy fernlands. Associated woodlands occur at the margins. The community encompasses the associated woodlands that are also affected by the hydrology of each mound spring. The community is distinguished in particular by the invertebrate biota that inhabit them, and also the sedgelands or grasslands that typify the core seepage zones of the springs. Most of the sedges present on these mound springs are restricted to the periphery of wetlands and creeks, or broad drainage depressions on sandier soils where grasses are dominant. Eight plant species found in the mound spring community have priority conservation status in Western Australia: *Cyperus unioloides* (uniola flatsedge; priority 1), *Eleocharis ochrostachys* (spike rush; priority 3), *Eriocaulon inapertum* (pipewort; priority 1), *Lobelia leucotos* (blue lobelia; priority 1), *Rhynchospora gracillima* (thin beaksedge; priority 1), *Rhynchospora rubra* (priority 3), *Spiranthes sinensis* (austral ladies tresses; priority 1) and *Utricularia circumvoluta* (bladderwort; priority 1). Seven of these species (all except *Rhynchospora rubra*) are considered useful indicators of mound springs in this location, since their occurrence is almost entirely restricted to mound springs in Western Australia, or their margins.
29	Perched wetlands of the Wheatbelt region with extensive stands of living swamp sheoak (*Casuarina obesa*) and paperbark (*Melaleuca strobophylla*) across the lake floor	The community occurs in large ephemeral wetlands in the inland Wheatbelt of south-west Western Australia. It comprises intact *Casuarina obesa* (swamp sheoak) and *Melaleuca strobophylla* (paperbark) dominated stands of vegetation over the lake floor.
30	Perth to Gingin Ironstone Association	The community occurs on ironstone soils in the Perth area and is characterised by massed everlastings. Many of the plant species present are specifically adapted to shallow seasonal inundation, specifically the rich herb layer present in late winter and early spring which is a major distinguishing characteristic of the community. The daisies *Rhodanthe manglesii*, *Rhodanthe spicata* and *Myriocephalus helichrysoides* dominate. Other common herbs include *Tribonanthes variabilis*

Item	Ecological community	Summary description
		(southern tiurndin), *Stylidium longitubum* (jumping jacks) (priority 4) and *Isotropis cuneifolia* subsp. *glabra* (priority 3). A very open shrub layer is typical with common shrubs *Melaleuca viminea* (mohan), *Banksia sessilis* (parrot bush), *Acacia saligna* (orange wattle), *Jacksonia furcellata* (grey stinkwood), *Grevillea curviloba* (endangered) and *Kunzea recurva*.
31	Plant assemblages of the Billeranga System as originally described in Beard (1976)	The community occurs in the Billeranga Hills in the north-eastern Wheatbelt of Western Australia. It generally comprises: *Melaleuca filifolia* (wiry honeymyrtle)—*Allocasuarina campestris* thicket on clay sands over laterite on slopes and ridges; open mallee over mixed scrub on yellow sand over gravel on western slopes; *Eucalyptus loxophleba* (York gum) woodland over sandy clay loam or rocky clay on lower slopes and creeklines; and mixed scrub or scrub dominated by *Dodonaea inaequifolia* over red brown loamy soils on the slopes and ridges. The community was originally described in Beard J.S. (1976) *The vegetation of the Perenjori area, Western Australia: Map and explanatory memoir.* (1:250,000 vegetation series, Vegmap Publications, Perth, Western Australia).
32	Plant assemblages of the Inering System as originally described in Beard (1976)	The community occurs in the Inering Hills in the northern Wheatbelt of Western Australia. It generally comprises: *Allocasuarina campestris* scrub over chert and granite hills; *Allocasuarina campestris* thicket with scattered *Acacia acuminata* and *Allocasuarina huegeliana* (rock sheoak) over brown sandy loam over stony and lateritic summits and slopes; *Acacia* sp. mixed low woodland on red brown sandy loam over granite on summits and slopes; *Melaleuca cardiophylla* (tangling melaleuca) thicket with scattered *Eucalyptus loxophleba* (York gum) and *Eucalyptus salmonophloia* (salmon gum) over granite on the lower slopes and foothills; and *Eucalyptus loxophleba* woodland over clay loam on the foothills. The community was originally described in Beard J.S. (1976) *The vegetation of the Perenjori area, Western Australia: Map and explanatory memoir.* (1:250,000 vegetation series, Vegmap Publications, Perth, Western Australia).
33	Plant assemblages of the Moonagin System as originally described in Beard (1976)	The community occurs on the fine-grained Archaean rocks of the Moonagin and Milhun Ranges. It generally comprises *Acacia* spp. scrub on red soil on the summits and slopes of the hills; *Acacia* spp. scrub with scattered *Eucalyptus loxophleba* (York gum) and *Eucalyptus oleosa* (giant mallee) on red loam flats on the foothills; and *Eucalyptus loxophleba* woodland on red loam flats of the pediments. The community was originally described in Beard J.S. (1976) *The vegetation of the Perenjori area, Western Australia: Map and explanatory memoir.* (1:250,000 vegetation series, Vegmap Publications, Perth, Western Australia).
34	Scott River Ironstone Association	The community occurs in a winter-wet habitat on red clay to clay loam often over massive ironstone on the Scott Coastal Plain. It mainly comprises heaths, shrublands and thickets and is variously dominated by *Melaleuca preissiana* (moonah), *Hakea tuberculata*, *Kunzea micrantha* or *Melaleuca incana* subsp. Gingilup (priority 2), depending on the degree of waterlogging. The understorey is generally dominated by *Loxocarya magna* (priority 3). Most occurrences have very diverse annual flora of *Stylidium* spp. (triggerplants), *Centrolepis* spp., *Schoenus* spp., *Aphelia* spp. and other herbs. The community also contains a number of endemic and restricted taxa such as *Darwinia ferricola* (endangered), *Grevillea manglesioides* subsp. *ferricola* (priority 3), *Lambertia orbifolia* subsp. Scott River Plains (endangered) and *Melaleuca incana* subsp. Gingilup (priority 2).
35	Sedgelands in Holocene dune swales of the southern Swan Coastal Plain (floristic community type 19 as originally described in Gibson et al. 1994)	The community is within wetland depressions (swales) occurring between parallel Holocene dunes, mostly located on the Rockingham-Becher Plain but also extending further north to Lancelin and south to Dalyellup. Typical and common native species in the community are the shrubs *Acacia rostellifera* (summer-scented wattle), *Acacia saligna* (orange wattle) and *Xanthorrhoea preissii* (balga), the sedges *Machaerina juncea* (bare twigrush), *Ficinia nodosa* (knotted club rush) and *Lepidosperma gladiatum* (coast sword-sedge), and the grass *Poa porphyroclados*. The community is also known as 'floristic community type 19' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).

Item	Ecological community	Summary description
36	Shrublands and woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20c as originally described in Gibson et al. 1994)	The community occurs mainly on the transitional soils of the Ridge Hill Shelf, on the Swan Coastal Plain adjacent to the Darling Scarp, but also extends marginally onto the alluvial clays deposited on the eastern fringe of the Swan Coastal Plain. It has been recorded between Stratton and Maddington. It generally comprises a shrubland or woodland of *Banksia attenuata* (slender banksia) and *Banksia menziesii* (firewood banksia), sometimes with *Allocasuarina fraseriana* (western sheoak), over a shrub layer that can include the species *Adenanthos cygnorum* (woolybush), *Hibbertia huegelii*, *Scaevola repens* var. *repens* (fan flower), *Allocasuarina humilis* (dwarf sheoak), *Bossiaea eriocarpa* (common brown pea), *Hibbertia hypericoides* (yellow buttercups) and *Stirlingia latifolia* (blueboy). A suite of herbs including *Conostylis aurea* (golden conostylis), *Trachymene pilosa* (native parsnip), *Lomandra hermaphrodita*, *Burchardia congesta* (milkmaids) and *Patersonia occidentalis* (purple flag), and the sedges *Mesomelaena pseudostygia* (semaphore sedge) and *Lyginia barbata* usually occur in the community. The community is also known as 'floristic community type 20c' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
37	Shrublands on calcareous silts of the Swan Coastal Plain (floristic community type 18 as originally described in Gibson et al. 1994)	The community is recorded from between Yalgorup National Park and Bunbury. It is species rich, consists of open low shrubs with a rich annual flora and is known from calcareous silt flats. A suckering form of *Acacia saligna* (orange wattle), *Melaleuca viminea* (mohan), *Melaleuca teretifolia* (banbar), *Hakea varia* (variable-leaved hakea), *Xanthorrhoea preissii* (balga) and *Leptomeria ellytes* are common in the shrub layer, with sedges including *Lepidosperma longitudinale* (pithy sword-sedge) and *Gahnia trifida* (coast saw-sedge), and a suite of herbs including *Meionectes tenuifolia* (priority 3) also common. The community is also known as 'floristic community type 18' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
38	Shrublands on southern Swan Coastal Plain Ironstones (Busselton area) (floristic community type 10b as originally described in Gibson et al. 1994)	This species-rich plant community is a seasonal wetland on ironstone sheet rock overlain by shallow loam soils on the Swan Coastal Plain and Whicher Scarp near Busselton. Much of the species diversity comes from annuals and geophytes (plants with an underground storage organ). Typical and common shrubs include *Kunzea rostrata*, *Pericalymma ellipticum* (swamp teatree), *Hakea oldfieldii*, *Hemiandra pungens* (snakebush) and *Viminaria juncea* (swishbush). *Aphelia cyperoides* (hairy aphelia) and *Centrolepis aristata* (pointed centrolepis) also commonly occur. Many taxa in the community are endemic to this unusual geology including a suite of threatened flora. The community is also known as 'floristic community type 10b' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
39	Southern wet shrublands, Swan Coastal Plain (floristic community type 2 as originally described in Gibson et al. 1994)	The community typically comprises shrublands or open woodlands. It occurs on seasonally inundated sandy clay soils that are restricted to small remnants on the eastern side of the Swan Coastal Plain. It has been recorded from Forrestfield to Chapman Hill. The community has moderate species richness with the occurrence of species reflecting the wetter nature of the sites. Typical and common native taxa in the community are the shrubs *Kingia australis* (kingia), *Pericalymma ellipticum* (swamp teatree), *Hakea ceratophylla* (horned leaf hakea), *Calothamnus lateralis*, *Hypocalymma angustifolium* (white myrtle), *Eutaxia virgata*, *Stirlingia latifolia* (blueboy), *Banksia dallanneyi* (couch honeypot) and herbs, rushes and sedges including *Dampiera linearis* (common dampiera), *Comesperma virgatum* (milkwort), *Stylidium brunonianum* (pink fountain triggerplant), *Thysanotus multiflorus* (many-flowered fringe lily) and *Mesomelaena tetragona* (semaphore sedge). The community also contains priority flora including *Isopogon formosus* subsp. *dasylepis* (priority 3) and *Grevillea brachystylis* subsp. *brachystylis* (priority 3). This community is also known as 'floristic community type 2' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of*

Item	Ecological community	Summary description
		the southern Swan Coastal Plain (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
40	Stromatolite community of stratified hypersaline coastal lakes (Lake Thetis)	The community occurs in Lake Thetis, Cervantes. It comprises a distinctive and diverse group of benthic microbial assemblages, each producing a mat that is associated with one specific zone within the lake. Crenulate cyanobacterial mats occur in the low-lying areas adjacent to the lake. Lithified stromatolites, resembling those at Shark Bay, with patches of living cyanobacterial mats and nodular mats characterise the littoral areas. Filamentous mats reside in cavities and coat the surface of the flocculant mat in the basin, a mobile diatomaceous mat occurs in the shallows, and thick flocculant mats of phototrophic prokaryotes, other microbes and/or diatoms occur in the central basin. Lake Thetis has benthic microbial mats adjacent to the lithified stromatolites and well-developed flocculant mats in the basin. Under current conditions microbial reef-forming communities and flocculant mat communities are both scarce. Some stromatolites have branching columns.
41	Stromatolite like freshwater microbialite community of coastal brackish lakes (Lake Clifton)	The community occurs on a relict foredune plain on Holocene sands at Lake Clifton. It is a thrombolitic community comprising a complex assemblage of photosynthetic cyanobacteria and purple sulphur bacteria, eukaryotic microalgae and true bacteria. The thrombolitic structures generally have an internal clotted structure and are formed through precipitation of calcium carbonate within the microenvironment of microbes as a result of photosynthetic and metabolic activity. The most abundant cyanobacterium in the early 1990s was Scytonema, as well as others including Oscillatoria, Dichothrix, Chroococcus, Gloeocapsa, Johannesbaptistia, Gomphosphaeria and Spirulina (Moore L.S. 1993, *The modern thrombolites of Lake Clifton, south-western Australia,* unpublished doctoral thesis, The University of Western Australia). More recent work suggests there has been a dramatic shift in the cyanobacterial population.
42	Stromatolite like microbialite community of coastal freshwater lakes (Lake Richmond)	The community occurs on a relict foredune plain on Holocene sands at Lake Richmond, Rockingham. It is a thrombolitic community comprising a complex assemblage of photosynthetic cyanobacteria and purple sulphur bacteria, eukaryotic microalgae and true bacteria. The thrombolitic structures generally have an internal clotted structure and are formed through precipitation of calcium carbonate within the microenvironment of microbes as a result of photosynthetic and metabolic activity.
43	Themeda grasslands (*Themeda* sp. Hamersley Station (M.E. Trudgen 11431)) on cracking clays (Hamersley Station, Pilbara)	The community is known from Hamersley Station in the Pilbara. It comprises an open to closed tussock grassland on cracking clays and is dominated by the perennial *Themeda* sp. Hamersley Station (M.E. Trudgen 11431; priority 3) growing to approximately 1.8m high. A suite of other grasses and herbs occur. In some areas there is scattered open overstorey of low trees present including *Hakea loreus* subsp. *loreus* (witinti) and *Eucalyptus victrix* (smooth-barked coolibah).
44	Unwooded freshwater wetlands of the southern Wheatbelt of Western Australia, dominated by *Duma horrida* subsp. *abdita* and *Tecticornia verrucosa* across the lake floor (Lake Bryde)	The community occurs in freshwater wetlands (Lake Bryde wetland system) of the southern Wheatbelt of Western Australia. The habitat of this community is characterised by intermittent inundation and it sometimes holds little water for several consecutive years. The major components of the community and other biota depend on relatively fresh water and regular drying out of the clay and silt wetland bed for survival. In addition to *Duma horrida* subsp. *abdita* (threatened) and *Tecticornia verrucosa* across the lake floor, the wetlands support fringing open woodlands of *Eucalyptus occidentalis* (flat-topped yate) over *Melaleuca strobophylla* dominated scrub.
45	Vegetation alliances on ridges and slopes of the chert hills of the Coomberdale floristic region	The community occurs on ridges and slopes of the chert hills of the Coomberdale floristic region. It was originally described in Griffin E.A. (1992) *Floristic survey of remnant vegetation in the Bindoon to Moora area, Western Australia* (Resource Management Technical Report 142, Department of Agriculture, Western Australia). It encompasses seven vegetation alliances including the core units and three vegetation alliances of the buffer units of the Coomberdale Chert community. Core

Item	Ecological community	Summary description
		vegetation alliances include *Allocasuarina campestris* (sheoak) shrubland, *Allocasuarina microstachya* scrub, *Regelia megacephala* (priority 4) shrubland, *Kunzea praestans* shrubland and scrub, *Melaleuca calyptroides* heath, *Hibbertia subvaginata* shrubland and *Xanthorrhoea drummondii* shrubland.

Division 2—Endangered ecological communities

Item	Ecological community	Summary description
1	*Corymbia calophylla—Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as originally described in Gibson et al. 1994)	The community is known from the eastern side of the Swan Coastal Plain largely between Wannamal and Dunsborough. Most occurrences of the community are dominated by both *Corymbia calophylla* (marri) and *Eucalyptus marginata* (jarrah) with additional common taxa comprising low shrubs, sedges, grasses and herbs. These include *Bossiaea eriocarpa* (common brown pea), *Conostylis juncea*, *Hibbertia hypericoides* (yellow buttercups), *Morelotia octandra*, *Chamaescilla corymbosa* (blue squill), *Desmocladus fasciculatus*, *Banksia dallanneyi* (couch honeypot), *Mesomelaena tetragona* (semaphore sedge), *Babingtonia camphorosmae* (camphor myrtle), *Lepidosperma squamatum*, *Neurachne alopecuroidea* (foxtail mulga grass), *Philotheca spicata* (pepper and salt), *Burchardia congesta* (milkmaids), *Caesia micrantha* (pale grass-lily), *Kingia australis* (kingia), *Drosera erythrorhiza* (red ink sundew), *Lomandra hermaphrodita* and *Caladenia flava* (cowslip orchid). The community is also known as 'floristic community type 3b' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
2	*Corymbia calophylla—Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally described in Gibson et al. 1994)	The community occurs on heavy soils of the eastern side of the southern Swan Coastal Plain, generally between Bullsbrook and Stratham. The community is usually dominated by *Corymbia calophylla* (marri) and *Xanthorrhoea preissii* (balga). It also occasionally includes *Eucalyptus wandoo* (wandoo). The more common shrubs include *Gompholobium marginatum*, *Hypocalymma angustifolium* (white myrtle) and *Banksia dallanneyi* (couch honeypot), with herbs, grasses and sedges including *Burchardia congesta* (milkmaids), *Cyathochaeta avenacea*, *Neurachne alopecuroidea* (foxtail mulga grass), *Caesia micrantha* (pale grass-lily), *Mesomelaena tetragona* (semaphore sedge), *Morelotia octandra*, *Desmocladus flexuosus*, *Opercularia vaginata* (dog weed), *Sowerbaea laxiflora* (purple tassels), *Lepidosperma* spp. and *Drosera menziesii* (pink rainbow) also common. The community is also known as 'floristic community type 3c' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
3	Dense shrublands on clay flats (floristic community type 9 as originally described in Gibson et al. 1994)	The community occurs as shrublands or open woodlands on clay flats that are inundated for long periods. It has been recorded between Moore River National Park and Dunsborough. Sedges are more apparent in the community than in other claypans, generally with moderate frequencies of *Chorizandra enodis* (black bristlerush), *Cyathochaeta avenacea*, *Lepidosperma longitudinale* (pithy sword-sedge) and *Leptocarpus coangustatus*. The community has a lower species richness and weed frequency than other claypan threatened ecological communities. The community is also known as 'floristic community type 9' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
4	Herb rich saline shrublands in clay pans (floristic community type 7 as originally	The community is generally dominated by *Melaleuca viminea* (mohan), *Melaleuca osullivanii*, *Melaleuca cuticularis* (saltwater paperbark) or *Casuarina obesa* (swamp sheoak) or a mixture of these species. It has been recorded between Mogumber and Ambergate on heavy clay soils that are generally inundated from winter to mid-summer. The species *Melaleuca cuticularis* and *Casuarina obesa* may indicate some saline influence for at

	described in Gibson et al. 1994)	least part of the year. Herbs such as *Brachyscome bellidioides*, *Centrolepis polygyna* (wiry centrolepis), *Pogonolepis stricta* (stiff angianthus) and *Cotula coronopifolia* (waterbuttons; note: listed as alien in Florabase) are typical of this community. In addition, species such as *Angianthus drummondii* (priority 3), *Eryngium pinnatifidum* subsp. Palustre (priority 3) and *Blennospora drummondii* occur in the community at low frequency. A suite of annual flora is seen in the community as the season progresses. In early spring many of the occurrences of the community are covered by free water up to 30cm deep. *Cotula coronopifolia* sometimes forms yellow floating mats in some pools while others may be dominated by *Ornduffia submersa* (priority 4). Aquatic species are common in the community early in the growing season. As the wetland dries a succession of species such as *Centrolepis* spp. and annual *Stylidium* spp. successively germinate, grow and flower, resulting in an extended flowering period of over three months. The community is also known as 'floristic community type 7' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
5	Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson et al. 1994)	The community has been recorded between Bullsbrook and Ludlow and occurs in low-lying flats with a clay impeding layer that facilitates seasonal inundation. The vegetation can be dominated by *Viminaria juncea* (swishbush), *Melaleuca viminea* (mohan), *Melaleuca lateritia* (robin redbreast bush) or *Melaleuca osullivanii* (broombush) but also occasionally by *Eucalyptus wandoo* (wandoo). Commonly occurring flora include *Hypocalymma angustifolium* (white myrtle), *Acacia lasiocarpa* var. *bracteolata* (long peduncle form) and *Verticordia huegelii* (variegated featherflower), and aquatic annuals. The community is also known as 'floristic community type 8' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
6	Monsoon (vine) thickets on the coastal sand dunes of Dampier Peninsula	This community is a type of rainforest ecosystem that occurs in discrete patches along the Dampier Peninsula, from Broome to Derby in the south-western portion of the Kimberley region. Vine thickets occur as discrete areas of dense vegetation and can occur as a stand of a few trees or as larger patches. Common tree and tall shrub species include *Terminalia petiolaris* (Marool or blackberry tree), *Grewia breviflora* (currant or coffee fruit), *Celtis strychnoides* (goonj), *Diospyros humilis* (ebony wood), *Sersalisia sericea* (nangi), *Exocarpos latifolius* (broad-leaved cherry), *Mimusops elengi* (walara), *Lysiphyllum cunninghamii* (bauhinia or jigal tree), *Gyrocarpus americanus* subsp. *pachyphyllus* (helicopter tree), *Flueggea virosa* subsp. *melanthesoides* (dogwood), *Croton habrophyllus* and *Dodonaea platyptera* (broad-winged hop bush). The most common climbers are *Abrus precatorius* (crabs eyes), *Capparis lasiantha* (bush caper), *Tinospora smilacina* (snake vine), *Jasminum didymum*, *Caesalpinia major* and *Vincetoxicum cinerascens* (oyster-catcher bill).
7	Rimstone pools and cave structures formed by microbial activity on marine shorelines (Augusta microbialites)	The community occurs along the south-west coast near Augusta and comprises microbialites, which are structures produced through the growth and metabolic activity of benthic microbial communities. The tufa that comprise the community are microbialite structures that have a less defined internal framework that are precipitated from freshwater springs and seeps, formed through the growth and metabolic activity of a diverse variety of microbial organisms, including cyanobacteria, diatoms and other algal components. They form chemical sedimentary rock composed of calcium carbonate. These tufa have many forms including drapes, curtains, small cylindrical stalactites and larger campanulate (bell-shaped) masses on the sea cliffs, as well as fans or terraces consisting of a series of rimstone pools and nodular masses in small brackish pools.
8	Shrublands and woodlands on Muchea Limestone of the Swan Coastal Plain	The community occurs on the heavy soils of the eastern side of the Swan Coastal Plain and has been recorded between Beermullah and Wokalup. Known patches include wetland and well-drained habitats, in a variety of landforms. It is defined on the basis of substrates with a limestone influence. Many of the species are commonly associated with the limestone soils that occur on the coast, and do not generally occur further inland. Typical and common native species in areas of best developed limestone are: the tree *Casuarina obesa* (swamp sheoak); the mallees *Eucalyptus decipiens* (redheart) and *Eucalyptus foecunda* (narrow-leaved red mallee); the shrubs *Melaleuca huegelii* (chenille honey-myrtle), *Alyogyne huegelii* (lilac hibiscus), *Grevillea curviloba* (endangered), *Grevillea evanescens* (priority 1) and *Melaleuca systena* (coastal

		honeymyrtle); and the herb *Thysanotus arenarius* (sand-dune fringed lily). Where the limestone substrate is less well developed and limestone may occur as nodules or chunks, the flora assemblages can be influenced by other characteristics of the substrate, such as clay content, with the presence of calcicoles such as *Thysanotus arenarius, Gahnia trifida* (coast saw-sedge), *Eremophila glabra* (tar bush) and *Melaleuca brevifolia* (mallee honey-myrtle) providing evidence of the limestone influence. *Melaleuca huegelii* shrublands, *Eucalyptus decipiens* mallee, *Casuarina obesa* woodlands and *Melaleuca brevifolia, Melaleuca systena* or *Melaleuca viminea* shrublands have been recorded on Muchea Limestone.
9	Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson et al. 1994)	The community occurs on clay flats with thin skeletal soils and has been recorded largely between Wattle Grove and Sabina River. It comprises rapidly drying clay flats. Typical and common shrubs include *Hakea sulcata* (furrowed hakea), *Verticordia densiflora* (compacted featherflower), *Hakea varia* (variable-leaved hakea), *Pericalymma ellipticum* (swamp teatree) and *Viminaria juncea* (swishbush). *Aphelia cyperoides* (hairy aphelia), *Centrolepis aristata* (pointed centrolepis), *Drosera gigantea* (giant sundew) and *Drosera menziesii* (pink rainbow) also commonly occur. The community is also known as 'floristic community type 10a' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) *A floristic survey of the southern Swan Coastal Plain* (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).

Division 3—Vulnerable ecological communities

Item	Ecological community	Summary description
1	Assemblages of Roe River rainforest swamp	The known occurrence of the community is located within the Roe River area of the Prince Regent National Park in the northern Kimberley. The rainforest canopy is 16m high. Tree species include *Aglaia elaeagnoidea* (priyangu), *Alphitonia excelsa* (red ash; priority 2), *Alstonia actinophylla* (white cheesewood), *Antidesma ghaesembilla* (yangu), *Bombax ceiba* (kapok tree), *Carallia brachiata, Cryptocarya cunninghamii, Ficus hispida, Lophostemon grandiflorus, Melaleuca viridiflora* (broadleaf paperbark), *Melastoma affine, Memecylon pauciflorum, Nauclea orientalis* (Leichhardt pine), *Monoon australe, Sersalisia sericea* (nangi), *Syzygium angophoroides, Syzygium forte* subsp. *potamophilum, Timonius timon, Trema tomentosa* and *Vitex acuminata*. The camaenid land snail assemblages in rainforest communities of the Kimberley Region can be used to distinguish patches from similar rainforest communities elsewhere in northern Australia. The community was originally described in McKenzie N.L., Johnston R.B. and Kendrick P.G. (Eds.) (1991) *Kimberley rainforests of Australia* (Surrey Beatty & Sons, Chipping Norton, NSW, in association with the Department of Conservation and Land Management, Western Australia and the Department of Arts, Heritage and Environment, Canberra).
2	Assemblages of Theda Soak rainforest swamp	The known occurrence of the community comprises a patch of rainforest around a spring-fed soak (Theda Soak) on a floodplain in the east Kimberley. Trees grow to 20m high and include *Albizia lebbeck* (lebbeck tree), *Antidesma ghaesembilla* (yangu), *Bombax ceiba* (kapok-tree), *Garuga floribunda, Glochidion disparipes* (cheese tree), *Ficus aculeata* (sandpaper fig), *Ficus racemosa* var. *racemosa* (cluster fig tree), *Litsea glutinosa, Melaleuca leucadendra* (weeping paperbark), *Sesbania formosa* (white dragon tree), *Sterculia quadrifida* (orange-fruited kurrajong), *Syzygium nervosum* (Daly River satinash) and *Terminalia microcarpa* (damson plum). The camaenid land snail assemblage distinguishes this community. The community was originally described in McKenzie N.L., Johnston R.B. and Kendrick P.G. (Eds.) (1991) *Kimberley rainforests of Australia* (Surrey Beatty & Sons, Chipping Norton, NSW, in association with the Department of Conservation and Land Management, Western Australia and the Department of Arts, Heritage and Environment, Canberra).
3	Assemblages of Walcott Inlet rainforest swamps	The known occurrences of this community occur on the extensive floodplain that fringes a tidal mudflat in the Walcott Inlet in the north-west Kimberley. The community is focused on swampy rainforests, but associated swamp and woodland communities are included in the boundaries where they are closely linked with the rainforest. The vegetation structure varies with hydrology and includes dense rainforest

		to dense woodland, open savanna woodland, *Melaleuca* or grassy swamps and occasional open water. The rainforest vegetation comprises closed-canopy rainforest to 30m in height, and is dominated by *Ficus* spp., *Nauclea orientalis* (Leichhardt pine) and *Celtis strychnoides* (hackberry) over 1–3m high *Acrostichum speciosum* (mangrove fern). Eight priority flora occur in the community, including two not found anywhere else in Western Australia. Five threatened or endemic fauna including the endangered northern quoll (*Dasyurus hallucatus*) also occur. The tree *Cordia subcordata* and the snail *Torresitrachia* sp. were recorded at one patch of the community. The camaenid land snail assemblage distinguishes this community. The community was originally described in McKenzie N.L., Johnston R.B. and Kendrick P.G. (Eds.) (1991) *Kimberley rainforests of Australia* (Surrey Beatty & Sons, Chipping Norton, NSW, in association with the Department of Conservation and Land Management, Western Australia and the Department of Arts, Heritage and Environment, Canberra).
4	*Calothamnus graniticus* subsp. *graniticus* heaths on south-west coastal granites	The community is known from a narrow band parallel to the western shores of Geographe Bay near Meelup. It occurs in areas of exposed granite outcrops and isolated pockets of shallow gravelly-loam soils predominantly found lower in the landscape, but also in isolated pockets upslope where granite boulders dominate. The distinctive *Calothamnus graniticus* subsp. *graniticus* (one-sided bottle brush; priority 4) forms a dense shrub layer with *Gastrolobium spinosum* (prickly poison), *Allocasuarina humilis* (dwarf sheoak) and *Dodonaea ceratocarpa*. Downslope, smaller shrubs include *Boronia tenuis* (blue boronia; priority 4), *Chorizema aciculare* (needle-leaved chorizema), *Hibbertia hypericoides* (yellow buttercups), *Hibbertia spicata*, *Lysiandra calycina* (false boronia), *Thryptomene saxicola* (rock thryptomene) and *Xanthorrhoea preissii* (balga). *Burchardia congesta* (milkmaids), *Caladenia caesarea* subsp. *maritima* (cape mustard orchid; critically endangered), a fern *Cheilanthes austrotenuifolia*, *Conostylis setigera* (bristly cottonhead), *Laxmannia sessiliflora* (nodding lily), *Lomandra micrantha* (small-flower mat-rush), triggerplants including *Stylidium affine* (queen triggerplant), *Stylidium megacarpum*, *Stylidium repens* (matted triggerplant) and sedges and grasses *Lepidosperma squamatum*, *Morelotia octandra* and *Neurachne alopecuroidea* (foxtail mulga grass) can also be found in the understorey.
5	Cape Range Remipede Community (Bundera Sinkhole)	The community is known from the Bundera Sinkhole, which is a landlocked body of water with a subterranean connection to the ocean (an anchialine cave). Anchialine ecosystems are inland underground mixohaline waters (seawater dilutes of variable salinity) affected by marine tides, usually with little if any surface exposure. The community comprises a rich stygobitic faunal assemblage composed primarily of crustaceans but also includes a blind fish, *Milyeringa veritas* (blind gudgeon). The crustaceans include atyid shrimp, ostracods, gammarid amphipods, diverse copepods and the remipede *Kumonga exleyi* of the crustacean class Remipedia (a class of blind crustaceans).
6	Depot Springs stygofauna community	The community is known from the Depot Springs groundwater calcrete in Sandstone. It comprises an assemblage of stygofaunal (groundwater) species not known from anywhere else. The calcretes that support the community include those around Friday Well and Puncture Well (southern) and in the area of the shearing shed on Depot Springs Station (northern). Species restricted to this community include Dytiscidae (water beetles), *Limbodessus fridaywellensis* and *Paroster hinzeae*. The dytiscid (water beetle) species are known only from the Depot Springs calcrete, and the latter species only from Friday Well and belong to a different tribe of invertebrates (Hydroporini). Other fauna from Friday Well itself include Ostracoda (aquatic crustaceans: *Ryocypris* n. sp., *Plesiocypridopsis* n. sp., *Candonopsis* n. sp. 1), Cyclopoida (small custaceans: *Halicyclops* n. sp. 2, *Apocyclops* n. sp. 1, *Metacyclops* n. sp. 1) and Harpacticoida (New genus sp. 1 (Canthocamptidae)).
7	Herbaceous plant assemblages on Bentonite Lakes as originally described by Griffin and Associates (1991)	The community occurs on the lake margins of bentonite lakes in the Watheroo-Marchagee region as originally described by Griffin E.A. and Associates (1991) *Flora and Vegetation of Watheroo Bentonitic Lakes* (unpublished report prepared for Bentonite Australia Pty Ltd). The community comprises herbaceous plant assemblages dominated by a combination of *Triglochin mucronata*, *Trichanthodium exilis*, *Asteridea athrixioides* and *Puccinellia stricta* (marsh grass) on the lake beds, and a combination of *Siemssenia capillaris* (wiry podolepis), *Angianthus tomentosus* (camel-grass) and *Pogonolepis stricta* (stiff angianthus). These herbaceous plant assemblages are characterised by a dependence on a bentonite (saponite) substrate—naturally restricted to the lake beds and margins of perched, ephemeral freshwater playa lakes and claypans of the Watheroo-Marchagee region. While most lakes comprise only herbaceous species, there are a number with varying densities of *Casuarina obesa*

		(swamp sheoak) trees, and shrubs of *Melaleuca lateriflora* (gorada) and *Acacia ligustrina*.
8	Herblands and bunch grasslands on gypsum lunette dunes alongside saline playa lakes	The community has been recorded from the Lake Magenta area, on grey sandy clay on the top of a lake edge dune on gypsum lunette dunes alongside saline playa lakes. Floristic composition includes the taxa *Rytidosperma caespitosum*, *Lawrencia squamata*, *Maireana marginata*, *Podolepis rugata* (pleated podolepis), *Senecio pinnatifolius* var. *maritimus* (coastal groundsel), *Asteridea chaetopoda*, *Atriplex paludosa* (marsh saltbush), *Tecticornia syncarpa*, *Scaevola spinescens* (currant bush) and *Austrostipa juncifolia*.
9	Russell Range mixed thicket complexes	The community occurs within the Russell Range system and was originally described in Beard J.S. (1973) *The vegetation of the Esperance and Malcolm areas, Western Australia: Map and explanatory memoir* (1:250,000 series, Vegmap Publications, Perth, Western Australia). It consists of an open mallee or shrub mallee-heath on the mid to upper slopes. Typical species are *Eucalyptus doratoxylon* (spearwood mallee), *Adenanthos oreophilus*, *Dampiera parvifolia* (many-bracted dampiera), *Dielsiodoxa oligarrhenoides*, *Chorizema nervosum*, *Acacia triptycha*, *Hakea pandanicarpa*, *Beaufortia raggedensis* (Mt Ragged beaufortia), *Daviesia grossa* and the endemic priority taxa *Banksia prolata* subsp. *archeos* (priority 2), *Beaufortia raggedensis* (Mt Ragged beaufortia; priority 2), *Rhadinothamnus rudis* subsp. *linearis* (priority 4) and *Gastrolobium tergiversum* (priority 2). Other priority flora include *Beyeria simplex* (priority 2), *Darwinia* sp. Mt Ragged (priority 2), *Dielsiodoxa propullulans* (priority 2), *Leucopogon apiculatus* (priority 3), *Styphelia rotundifolia* (priority 3), *Opercularia hirsuta* (silky-haired stinkweed; priority 2), *Scaevola brookeana* (priority 2), *Gastrolobium pycnostachyum* (Mt Ragged poison; priority 2) and *Kennedia beckxiana* (Cape Arid kennedia; priority 4), which occur mainly on the mid-lower slopes. *Anthocercis viscosa* (sticky tailflower) is common on granite on the south coast from Walpole to Cape Arid and occurs at its inland or eastern limit on Mt Ragged.
10	Species-rich faunal community of the intertidal flats of Roebuck Bay	The community occurs on the intertidal mudflats of Roebuck Bay. Roebuck Bay is a sheltered marine embayment on the macrotidal Kimberley coast containing large intertidal flats composed predominantly of carbonate sediments, which receives freshwater inputs to the bay mainly during the wet season. The community comprises a diverse and abundant marine fauna, with an estimated 300–500 species of macrobenthic fauna as well as a high diversity and abundance of migratory shorebirds. The threatened species *Caretta caretta* (loggerhead turtle), *Chelonia mydas* (green turtle), *Natator depressus* (flatback turtle) and the dwarf sawfish *Pristis clavata* (priority 1), as well as large proportions of the Australian populations of the birds *Limosa lapponica* (bar-tailed godwit; migratory species) and the threatened *Calidris (Calidris) tenuirostris* (great knot), utilise the habitat and comprise part of the assemblage.
11	Thumb Peak, Mid Mount Barren, Woolburnup Hill (Central Barren Ranges) *Eucalyptus acies* mallee heath	The community is restricted to three quartzite mountains within the Fitzgerald River National Park. It is characterised by a high diversity of proteaceous shrubs accompanied by several taxa endemic to or prevalent in high altitudinal areas of the Barren and Stirling Ranges. Three endangered flora species, *Daviesia obovata*, *Coopernookia georgei* (mauve coopernookia) and *Grevillea infundibularis* (fan-leaf grevillea), and a suite of priority flora occur within the community, some restricted only to mountain peaks. Common taxa include *Eucalyptus acies* (Woolburnup mallee), *Gastrolobium crenulatum* (priority 2), *Andersonia echinocephala* (priority 4), *Petrophile divaricata*, *Grevillea coccinea* subsp. *lanata* (priority 3) and *Xanthosia candida*. Other taxa include *Eucalyptus preissiana* subsp. *preissiana* (bell-fruited mallee), *Banksia heliantha* (oak-leaved dryandra), *Banksia falcata* (prickly dryandra), *Banksia plumosa* subsp. *plumosa*, *Banksia baueri* (woolly banksia), *Banksia nutans* var. *nutans* (nodding banksia), *Banksia lemanniana* (Lemann's banksia), *Banksia oreophila* (mountain banksia), *Hakea cucullata* (hood-leaved hakea), *Hakea hookeriana*, *Grevillea fistulosa*, *Adenanthos labillardierei*, *Beaufortia anisandra* (dark beaufortia), *Melaleuca striata*, *Sphaerolobium racemulosum*, *Daviesia striata*, *Taxandria spathulata*, *Acacia cedroides*, *Rinzia oxycoccoides* (large-flowered rinzia), *Dampiera loranthifolia*, *Stachystemon mucronatus* and *Mesomelaena stygia* subsp. *stygia*.

Date 10 May 2023.

Hon. REECE WHITBY, MLA, Minister for Environment.