# Geraldton Sandplain 3 *(GS3 - Lesueur Sandplain subregion)*

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## Subregional description and biodiversity values

### Description and area

The Geraldton Sandplains bioregion is composed mainly of proteaceous scrub-heaths, rich in endemics, on the sandy earths of an extensive, undulating, lateritic sandplain mantling Permian to Cretaceous strata. Extensive York Gum and Jam woodlands occur on outwash plains associated drainage. The Lesueur Sandplain (GS3) comprises coastal Aeolian and limestones, Jurassic siltstones and sandstones (often heavily lateritised) of central Perth Basin. Alluvials are associated with drainage systems. There are extensive yellow sandplains in south-eastern parts, especially where the subregions overlaps the western edge of the Pilbara Craton. Shrub-heaths rich in endemics occur on a mosaic of lateritic mesas, sandplains, coastal sands and limestones. Heath on lateritised sandplains along the subregions north-eastern margins. The climate is Mediterranean and the subregional area is 1,358,915 ha.

### Dominant land use

Mainly (iv) (see Appendix B, key b) dry-land agriculture (69.34%), with lesser areas of (xiii) conservation (17.6%), and (x) UCL and Crown reserves (12.5%).

### Continental Stress Class

The Continental Stress Class listed for GS3 is 4, however, it should be 3 or worse. The level of threat faced is similar to that of the Avon Wheatbelt, but the reserve system is more representative (particularly in the west of the subregion) due to Beekeepers Nature Reserve, Coomallo Nature Reserve, Lesueur and Badgingarra National Parks & Unallocated Crown Land. Over 60% of the area in conservation estate in this subregion is contained in these western reserves. The remainder of subregion has very few reserves, the majority of which are small and on agriculturally unproductive land and many of which are threatened by salinity.

### Known special values in relation to landscape, ecosystem, species and genetic values

Rare features:

- Lesueur floristic communities - a large number of distinct, species rich and geographically restricted communities occur in the Mt Lesueur and Coomallo area.
- Stygofauna of cave communities in the Beekeepers Nature Reserve area.

Rare Vertebrates:
Including: Peregrine Falcon (*Falco peregrinus*), Malleefowl (*Leipoa ocellata*), Carnaby's Cockatoo (*Calyptorhynchus latirostris*), Boullanger Island Dunnart (*Sminthopsis griseoventer boullangerensis*), Southern Dibbler (*Parantechinus apicalis*), Carpet Python (*Morelia spilota imbricata*), *Simoselaps calonotos*, Western Spiny-tailed Skink (*Egernia stokesii badia*).

Rare Flora:
A large number of rare flora are recorded from the area.

Ecosystem Types Which Have at Least 85% of Their Total Extent Confined to the Geraldton Sandplains 3 Subregion:

| Beard Veg Assoc | Vegetation Description |
|---|---|
| 254 | Shrublands; *Melaleuca uncinata* thicket with scattered wandoo and powderbark wandoo |
| 255 | Shrublands; mallee scrub, *Eucalyptus dongarraensis* |
| 377 | Mosaic: Shrublands; scrub-heath on limestone in the northern Swan Region / Sparse low woodland; illyarrie |
| 378 | Shrublands; scrub-heath with scattered *Banksia spp E. todtiana* & *Xylomelum angustifolium* on deep sandy flats in the Geraldton Sandplain Region |
| 379 | Shrublands; scrub-heath on lateritic sandplain in the central Geraldton Sandplain Region |
| 391 | Shrublands; *Melaleuca uncinata* thicket |
| 392 | Shrublands; *Melaleuca thyoides* thicket |
| 393 | Shrublands; *Melaleuca thyoides* thicket with scattered *Casuarina obesa* |
| 432 | Shrublands; *Acacia rostellifera* & *Melaleuca cardiophylla* thicket |
| 694 | Shrublands; scrub-heath on yellow sandplain banksia-xylomelum alliance in the Geraldton Sandplain & Avon-Wheatbelt Regions |
| Beard Veg Assoc | Vegetation Description |
| 697 | Shrublands; scrub-heath on lateritic sandplain in the southern Geraldton Sandplain Region |
| 748 | Shrublands; *Melaleuca thyoides* thicket with scattered river gum |

| | |
|---|---|
| 772 | Shrublands; *Acacia lasiocarpa* & *Melaleuca acerosa* heath |
| 1031 | Mosaic: Shrublands; hakea scrub-heath/Shrublands; dryandra heath |
| 1032 | Mosaic: Medium woodland; marri, wandoo, powderbark/Shrublands; dryandra heath |
| 1034 | Medium woodland; marri, wandoo & powderbark |
| 1037 | Medium woodland; York gum & river gum (incl e6,18Mr?) |
| 1044 | Mosaic: Medium woodland; York gum & salmon gum/Shrublands; *Melaleuca thyioides* thicket |
| 1149 | Shrublands; scrub-heath Acacia-Ecdeiocolia association in the south-east Geraldton Sandplain Region |

Centres of endemism:
The area exhibits extremely high floristic endemism, with over 250 species of sandplain flora endemic to the subregion. The area is known Australia-wide and internationally as having particularly high floristic diversity and levels of endemism.

Refugia:
Islands provide refugee from feral predators and herbivores for species such as Australian Sea Lions (*Neophoca cinerea*), Boullanger Island Dunnart (*Sminthopsis griseoventer boullangerensis*) and Southern Dibbler (*Parantechinus apicalis*).

High Species or Ecosystem Diversity:
Lesueur floristic communities - a large number of distinct, species rich and geographically restricted communities occur in the Mt Lesueur and Coomallo area.

## Existing subregional or bioregional plans and/or systematic reviews of biodiversity and threats

In 1974 the Conservation Through Reserves Committee (CTRC) made recommendations for reserves within the Geraldton Sandplains (System 5 – North Sand Heaths) in the CTRC Green Book (Environmental Protection Authority 1974). In 1976 these recommendations were further developed by the Environmental Protection Authority as the Red Book recommendations Environmental Protection Authority 1976). Some but not all of these recommendations (with modification) were implemented over the following ten years. No other systematic assessment of biodiversity has been undertaken in the subregion.

Although no systematic assessment of biodiversity was undertaken recommendations on reserve status of specific areas within the subregion have been included in the Lesueur National Park and Coomallo Nature Reserve Management Plan (Department of Conservation and Land Management 1995).

# Wetlands

## Wetlands of National significance (DIWA listings)

| Name & Code | Description[1] | Condition[2] | Trend[3] | Reliability[4] | Threatening Processes[5] |
|---|---|---|---|---|---|
| Lake - Logue Indoon System WA036 (GS002WA) | B6, B7, B10, B2 | ii | ii | iii | ix, x (increased inundation), viii (*Phytophthora* sp.), v (bees, foxes, cats, rabbits and pigs (deliberately dumped by pig hunters)), xiii (seismic blasting, gas fields; bees using tree hollows and excluding native insects and birds) |

[1]Appendix B, key d; [2]Appendix C, rank 2; [3]Appendix C, rank 3; [4]Appendix C, rank 1; [5]Appendix B, key e

## Wetlands of subregional significance (in addition to the DIWA listed wetlands)

| Name and Code | Location | Description[1] | Special Values[2] | Condition[3] | Trend[4] | Reliability[5] | Threatening Processes[6] |
|---|---|---|---|---|---|---|---|
| White and Green Lakes | 320 000 m E, 6 780 000m N | B7 | ii | ii | ii | ii | i, ii, iv, ix, x (overland flows) |
| Saline lakes of Coolimba – Jurien | 310 000 m E, 6 670 000 m N | B7 | ii | iii | iv | ii | vi (wild oats), xii (mining of gypsum) |

[1]Appendix B, key d; [2]Appendix B, key c; [3]Appendix C, rank 2; [4]Appendix C, rank 3; [5]Appendix C, rank 1; [6]Appendix B, key e

## Riparian zone vegetation

| Name | Condition[1] | Trend[2] | Reliability[3] | Threatening Processes[4] |
|---|---|---|---|---|
| Irwin River | i | iii | ii | ix, x (increased flow), i, ii, iv, v (foxes, rabbits and goats), vi (castor oil bush, box thorn, wild oats) |
| Hill River | i | ii | ii | ix, x (increased flow), i, ii, iv, v (foxes, rabbits and goats), vi (castor oil bush, box thorn, wild oats) |
| Moore River | i | iii | ii | ix, x (increased flow), i, ii, iv, v (foxes, rabbits and goats), vi (castor oil bush, victorian tea tree, wild oats) |
| Arrowsmith River | ii | iii | ii | xii (mining), iv, v (goats, pigs and rabbits), viii (*Phytopthora* dieback), vii (changed fire regimes), x (increased flow) |

[1]Appendix C, rank 2; [2]Appendix C, rank 3; [3]Appendix C, rank 1; [4]Appendix B, key e

# Ecosystems at risk

## Threatened ecological communities (TECs)

| Community | Status | NVIS[1] | Condition[2] | Trend[3] | Reliability[4] | Threatening Processes[5] |
|---|---|---|---|---|---|---|
| Lesueur-Coomallo Floristic Community D1 (Martinick and Associates 1988a) | E | 30 | iii | iv | iii | xi, ix |
| Lesueur-Coomallo Floristic Community A1.2 (Martinick and Associates 1988a) | E | 30 | iii | iv | iii | iv, v (goats, rabbits), vii |
| Herbaceous plant assemblages on bentonite lake beds (Vegetation Types 1,2,3&7) and margins (Vegetation Types 4,5&6) of the Watheroo-Marchagee region (Griffin 1991) | E | 30 | ii | iii | iii | iv, v (goats, rabbits), vii |
| Ferricrete floristic community (Rocky Springs type) (Griffin *et al.* 1983) | V | 29 | iii | iii | iii | iv, v (goats, rabbits), vii |

[1]Appendix B, key f; [2]Appendix C, rank 2; [3]Appendix C, rank 3; [4]Appendix C, rank 1; [5]Appendix B, key e

## Other ecosystems at risk

| Community | Status | NVIS[1] | Condition[2] | Trend[3] | Reliability[4] | Threatening Processes[5] |
|---|---|---|---|---|---|---|
| Critical weight range mammals (extant species *Trichosurus vulpecula hypoleucus, Macropus eugenii derbianus, Macropus irma;* locally extinct species *Parantechinus apicalis, Dasyurus geoffroii, Isoodon obesulus)* | E | Various | i | iii | ii | v (foxes, cats) |
| Lesueur-Coomallo Floristic Community M2 (Martinick and Associates 1988a) | V | 30 | iii | iv | iii | iv, v (goats, rabbits), vii |
| Lesueur-Coomallo Floristic Community DFGH (Martinick and Associates 1988a) | V | 30 | iii | iv | ii | iv, v (goats, rabbits), vii |
| Low heath dominated by *Petrophile chrysantha* on Lesueur Dissected Uplands (Griffin 1994) | V | 30 | iii | iv | iii | iv, v (goats, rabbits), vii |
| Spring communities, Eneabba sandplain (D. Rose pers. comm.) | V | 9 | ii | iii | i | iv, v (goats, rabbits), vii |
| Cave invertebrate communities of the Dongara area (R. Shepherd pers. comm.) | V | N/A | ii | vi | i | ix, x, xi |

[1]Appendix B, key f; [2]Appendix C, rank 2; [3]Appendix C, rank 3; [4]Appendix C, rank 1; [5]Appendix B, key e

# Species at risk

## Fauna

| Species | Status | Condition[1] | Trend[2] | Reliability[3] | Threatening Processes[4] |
|---|---|---|---|---|---|
| SCHEDULE 1; RARE/LIKELY TO BECOME EXTINCT, DIV 1 (MAMMALS) | | | | | |
| *Parantechinus apicalis* | E | i | iv | iii | xii (disturbance by human activities, |
| *Sminthopsis griseoventer boullangerensis* | V | iii | iv | iii | xii (disturbance by human activities) |
| SCHEDULE 1; RARE/LIKELY TO BECOME EXTINCT, DIV 2 (BIRDS) | | | | | |
| *Calyptorhynchus latirostris* | E | ii | ii | ii | ii, v (foxes & cats), xii (poaching of nests) |
| *Leipoa ocellata* | V | ii | iii | iii | v (foxes, cats), iii, iv |
| SCHEDULE 1; RARE/LIKELY TO BECOME EXTINCT, DIV 3 (REPTILES) | | | | | |
| *Egernia stokesii badia* | V | ii | iii | ii | ii, v (foxes, cats), iii |
| SCHEDULE 4; OTHER SPECIALLY PROTECTED FAUNA. DIVISION 2 (BIRDS) | | | | | |
| *Falco peregrinus* | SP | iii | iv | ii | ii |
| SCHEDULE 4; OTHER SPECIALLY PROTECTED FAUNA. DIVISION 3 (REPTILES) | | | | | |
| *Morelia spilota imbricata* | SP | ii | iii | iii | ii, v (foxes, cats), iii |
| OTHER SPECIES AT RISK WITHIN THE SUBREGION | | | | | |
| *Simoselaps calonotus* | V | ii | iii | ii | ii, v (foxes, cats), iii |

[1]Appendix C, rank 2; [2]Appendix C, rank 3; [3]Appendix C, rank 1; [4]Appendix B, key e

## Declared rare and priority flora

| Species Name | Status | Condition[1] | Trend[2] | Reliability[3] | Threatening Processes[4] |
|---|---|---|---|---|---|
| DECLARED RARE FLORA | | | | | |
| *Acacia aprica* | CR | ii | iii | iii | ii, vi |
| *Acacia cochlocarpa* subsp. *cochlocarpa* | CR | ii | iii | iii | ii, vi |
| *Acacia vassalii* | CR | ii | vi | iii | ii, vi |
| *Caladenia drakeoides* | CR | ii | iv | iii | i, ii, vi, vii |
| *Conospermum densiflorum* subsp. *unicephalatum* | CR | i | ii | ii | i, ii, vi |
| *Daviesia bursarioides* | CR | i | iii | iii | i, ii, vi, vii |
| *Daviesia dielsii* | CR | iii | vi | iii | i, ii |
| *Eucalyptus absita* | CR | i | iii | iii | i, ii, iv |
| *Eucalyptus dolorosa* | CR | ii | iii | iii | i, ii, vi, vii |
| *Grevillea althoferorum* | CR | ii | iii | iii | vii, ii, x, xii (track maintenance chemical), v (rabbits) |
| *Grevillea batrachioides* | CR | i | vi | iii | i, ii, vi, vii |
| *Grevillea calliantha* | CR | iii | iii | iii | i, ii, vi |
| *Grevillea humifusa* | CR | i | ii | iii | ii, vi, xii (track & fire break maintenance), iv, v, vii |
| *Hemiandra gardneri* | CR | ii | ii | iii | i, ii, vi, vii |
| *Jacksonia pungens* ms | CR | i | ii | ii | i, ii, viii, xii (low seed viability) |
| *Synaphea quartzitica* | CR | i | ii | iii | i, ii, xii (mining) |
| *Thomasia* sp. Green Hill (Paust 1322) | CR | ii | iii | ii | i, ii |
| *Drakaea elastica* | E | ii | vi | iii | i, ii, vi |
| *Dryandra serratuloides* subsp. *perissa* | E | ii | ii | iii | vii |
| *Eucalyptus balanites* x | E | ii | ii | iii | i, ii, xii (gravel scraping) |
| *Eucalyptus crispata* | E | iii | iv | iii | i, ii, vi |
| *Eucalyptus lateritica* | E | iii | iv | iii | i, ii, vi vii |
| *Eucalyptus leprophloia* | E | iii | iv | iii | i, ii, vi, vii, xii (insect damage) |
| *Eucalyptus pruiniramis* | E | iii | iv | iii | i, ii, vi, xii (gravel extraction) |

| Species Name | Status | Condition[1] | Trend[2] | Reliability[3] | Threatening Processes[4] |
|---|---|---|---|---|---|
| *Grevillea curviloba* subsp. *incurva* | E | | | iii | ii, vi, xii (track maintenance chemical), iv, v, vii |
| *Leucopogon obtectus* | E | i | ii | iii | i, ii, vii, viii (*Phytopthora* sp.), xii (mining) |
| *Patersonia spirafolia* | E | ii | iii | ii | i, ii |
| *Spirogardnera rubescens* | E | ii | iii | iii | i, ii, vii |
| *Thelymitra stellata* | E | ii | iii | iii | i, ii, vii |
| *Acacia recurvata* | V | ii | iii | iii | ii, vi |
| *Andersonia gracilis* | V | ii | iii | ii | ii |
| *Anigozanthos viridis* subsp. *terraspectans* | V | ii | iv | iii | ii, viii, vi |
| *Chamelaucium griffinii* ms | V | ii | vi | iii | i, i, vii |
| *Chorizema humile* | V | i | iii | iii | i, ii, vi, v, vii |
| *Darwinia chapmaniana* | V | ii | vi | iii | ii, i |
| *Eleocharis keigheryi* | V | ii | ii | iii | i, ii, vi, vii |
| *Eucalyptus johnsoniana* | V | iii | iv | iii | i, ii, vi, xii (mining), vii |
| *Eucalyptus rhodantha* var. *rhodantha* | V | iii | iv | iii | i, ii, xii (habitat degradation) |
| *Eucalyptus suberea* | V | iii | iii | iii | vii |
| *Hakea megalosperma* | V | iii | iv | iii | i, ii |
| *Ptychosema pusillum* | V | ii | vi | iii | i, ii, vii |
| *Stawellia dimorphantha* | V | iii | vi | iii | i, ii, vi, vii |
| PRIORITY 1 | | | | | |
| *Acacia congesta* subsp. *cliftoniana* | 1 | ii | vi | iii | ii, vi, vii |
| *Calectasia palustris* | 1 | ii | vi | ii | i, ii |
| *Corymbia chlorolampra* | 1 | ii | vi | ii | i, ii, vii |
| *Dampiera tephrea* | 1 | iii | vi | ii | ii |
| *Diuris* sp. Arrowsmith (K Dixon 924) | 1 | ii | vi | ii | i, ii, iv |
| *Drosera marchantii* subsp. *prophylla* | 1 | iii | vi | ii | i, ii, vi |
| *Eucalyptus absita x loxophleba* | 1 | ii | iii | iii | i, ii |
| *Eucalyptus annuliformis* | 1 | ii | iii | iii | i, ii |
| *Eucalyptus subangusta* subsp. *virescens* | 1 | ii | iii | ii | i, ii, vi, vii |
| *Grevillea metamorpha* | 1 | iii | vi | ii | ii, vi, iv, vii |
| *Grevillea pinifolia* | 1 | ii | iii | ii | ii, vi, vii |
| *Grevillea synapheae* subsp. A Flora of Australia (SD Hopper 6333)] | 1 | iii | iv | iii | i, ii |
| *Grevillea synapheae* subsp. *minyolo* | 1 | iii | iv | iii | i, ii |
| *Hypocalymma* sp. Cataby (GJ Keighery 5151) [aff. *tetrapterum*] | 1 | ii | ii | ii | i, ii, vi, vii |
| *Jacksonia* sp. Badgingarra (H Demarz D6601) [sp. 14] | 1 | ii | iii | ii | i, ii, vi, vii |
| *Lasiopetalum miseryense* ms | 1 | ii | ii | ii | i, ii, vi, vii |
| *Lasiopetalum ogilvieanum* | 1 | ii | iii | ii | i, ii, vi, vii |
| *Lepidium fasciculatum* | 1 | iii | vi | ii | i, ii, vi, vii |
| *Malleostemon* sp. Cooljarloo (B Backhouse s.n. 16.11.88) | 1 | ii | vi | ii | i, ii |
| *Mesomelaena stygia* subsp. *deflexa* | 1 | iii | vi | ii | i, ii |
| *Myriocephalus suffruticosus* | 1 | iii | vi | ii | ii |
| *Onychosepalum microcarpum* | 1 | ii | vi | ii | i, ii, vi, iv, vii |
| *Paracaleana dixonii* ms | 1 | ii | iii | iii | i, ii, vii |
| *Scaevola eneabba* | 1 | ii | ii | ii | ii, i, |
| *Stylidium pseudocaespitosum* | 1 | ii | iv | iii | i, ii |
| *Stylidium tinkeri* | 1 | ii | vi | ii | i, ii, iv, vi |
| *Synaphea oulopha* | 1 | iii | vi | ii | i, ii, iv, vii |
| Species Name | Status | Condition[1] | Trend[2] | Reliability[3] | Threatening Processes[4] |
| *Synaphea sparsiflora* | 1 | iii | vi | ii | i, vi, vii |

| | | | | | |
|---|---|---|---|---|---|
| *Tetratheca remota* | 1 | ii | vi | iii | i, ii |
| *Thomasia* sp. New Norcia (Cayser s.n. Nov 1918) | 1 | ii | ii | ii | i, ii |
| *Verticordia luteola* var. *rosea* | 1 | ii | iii | iii | ii, i |
| PRIORITY 2 | | | | | |
| *Acacia carens* | 2 | ii | vi | ii | ii, vi |
| *Acacia chapmanii* subsp. *chapmanii* | 2 | ii | vi | ii | ii, vi |
| *Acacia flabellifolia* | 2 | ii | vi | iii | ii, vi |
| *Acacia lanceolata* | 2 | ii | iii | iii | ii, vi |
| *Acacia lasiocarpa* var. *lasiocarpa* Cockleshell Gully variant (EA Griffin 2039) | 2 | ii | iii | ii | ii, i |
| *Acacia retrorsa* | 2 | ii | vi | iii | ii, i, vi |
| *Acacia vittata* | 2 | ii | iii | iii | ii |
| *Acacia wilsonii* | 2 | ii | vi | ii | ii, vi |
| *Andersonia longifolia* | 2 | ii | iii | ii | ii |
| *Anigozanthos humilis* subsp. *grandis* ms | 2 | ii | vi | iii | ii, vi |
| *Arnocrinum gracillimum* | 2 | ii | iii | ii | ii |
| *Baeckea* sp. Three Springs (ME Trudgen 5368) | 2 | ii | iii | ii | i, ii |
| *Boronia ramosa* subsp. *lesueurana* | 2 | ii | vi | ii | i, ii |
| *Boronia scabra* subsp. *condensata* | 2 | ii | vi | ii | i, ii |
| *Calectasia browneana* | 2 | ii | vi | ii | i, ii, v (pigs, goats) |
| *Calytrix platycheiridia* | 2 | iii | vi | iii | i, ii |
| *Caustis gigas* ms | 2 | ii | vi | iii | i, ii |
| *Comesperma rhadinocarpum* | 2 | i | vi | ii | i, ii, vi |
| *Daviesia debilior* subsp. *debilior* | 2 | iii | vi | ii | ii, i |
| *Dryandra catoglypta* | 2 | iii | vi | ii | i, ii, vi |
| *Dryandra cypholoba* | 2 | iii | vi | ii | i, ii, vi |
| *Eucalyptus angularis* | 2 | ii | iii | iii | ii, i |
| *Gompholobium* sp. Marchagee (BR Maslin 1427) [aff. *aristatum*] | 2 | ii | vi | ii | i, ii, vi |
| *Goodenia xanthotricha* | 2 | ii | iii | ii | i, ii, vi, vii |
| *Grevillea biformis* subsp. *cymbiformis* | 2 | ii | iii | ii | i, ii, vi, vii |
| *Grevillea bracteosa* | 2 | i | ii | iii | i, ii, vi (numerous) |
| *Grevillea delta* | 2 | ii | iii | ii | i, vi, vii |
| *Hydrocotyle coorowensis* | 2 | ii | ii | ii | x, ix, i, ii, vi |
| *Hypocalymma tenuatum* ms | 2 | ii | ii | ii | i, ii, vi, vii |
| *Hypocalymma xanthopetalum* var. *linearifolium* ms | 2 | ii | iii | ii | ii |
| *Hypolaena robusta* | 2 | ii | vi | ii | i, ii, vi, vii |
| *Lasiopetalum molle* subsp. *boothendarrense* ms | 2 | ii | ii | ii | i, ii, vi, vii |
| *Leucopogon plumuliflorus* | 2 | iii | vi | ii | i, ii, vi, vii |
| *Leucopogon* sp. Badgingarra (R Davis 421) | 2 | ii | ii | ii | i, ii, vi, vii |
| *Loxocarya gigas* | 2 | iii | vi | ii | i, ii, vi, vii |
| *Persoonia filiformis* | 2 | iii | iii | ii | ii, i |
| *Phlebocarya pilosissima* subsp. *teretifolia* | 2 | iii | iii | ii | ii, i |
| *Schoenus griffinianus* | 2 | iii | vi | ii | i, ii, iv, v (rabbits), vi, vii |
| *Scholtzia* sp. Eradu (RD Royce 8016) | 2 | iii | vi | ii | i, ii, iv, v (goats), vii |
| *Stenanthemum limitatum* | 2 | iii | vi | ii | ii, i |
| *Stylidium aeonioides* | 2 | iii | vi | iii | ii, i |
| *Stylidium torticarpum* | 2 | iii | vi | ii | i, ii, iv, ix |
| *Synaphea endothrix* | 2 | iii | vi | ii | i, ii, iv |
| *Synaphea lesueurensis* | 2 | iii | vi | ii | i, ii, iv |
| Species Name | Status | Condition[1] | Trend[2] | Reliability[3] | Threatening Processes[4] |
| *Synaphea rangiferops* | 2 | iii | vi | iii | i, ii, iv |
| *Thryptomene* sp. Lancelin (ME Trudgen 14000) | 2 | iii | vi | ii | vii, vi |

| | | | | | |
|---|---|---|---|---|---|
| *Tricoryne robusta* ms | 2 | iii | vi | iii | i, ii |
| *Verticordia blepharophylla* | 2 | iii | vi | ii | i, ii, iv, vii, v (rabbits) |
| Other Species at Risk | | | | | |
| *Catacolea enodis* | | iii | vi | ii | i, ii |

[1]Appendix C, rank 2; [2]Appendix C, rank 3; [3]Appendix C, rank 1; [4]Appendix B, key e

# Analysis of appropriate management scenarios

## Reservation priorities of ecosystems

| Beard Veg Assoc | Ecosystem Description | IUCN I-IV | Non-IUCN Reserve | CALM-Purchased Lease | Priority |
|---|---|---|---|---|---|
| 4 | Medium woodland; marri & wandoo | X | | | M |
| 7 | Medium woodland; York gum (*E. loxophleba*) & wandoo | X | | | H |
| 17 | Shrublands; *Acacia rostellifera* thicket | X | | | M |
| 31 | Shrublands; *Melaleuca thyoides* thicket with scattered York gum | | | | H |
| 49 | Shrublands; mixed heath | X | | | L |
| 125 | Bare areas; salt lakes | X | | | L |
| 126 | Bare areas; freshwater lakes | X | | | L |
| 129 | Bare areas; drift sand | X | | | L |
| 142 | Medium woodland; York gum & salmon gum | X | | | H |
| 254 | Shrublands; *Melaleuca uncinata* thicket with scattered wandoo and powderbark wandoo | | | | H |
| 255 | Shrublands; mallee scrub, *Eucalyptus dongarraensis* | X | | | L |
| 352 | Medium woodland; York gum | X | | | L |
| 354 | Shrublands; jam and *Acacia rostellifera* (+hakea?) scrub with scattered York gum | | | | L |
| 377 | Mosaic: Shrublands; scrub-heath on limestone in the northern Swan Region/Sparse low woodland; illyarrie | X | | | L |
| 378 | Shrublands; scrub-heath with scattered *Banksia* spp, *E. todtiana* & *Xylomelum angustifolium* on deep sandy flats in the Geraldton Sandplain Region | X | | | M |
| 379 | Shrublands; scrub-heath on lateritic sandplain in the central Geraldton Sandplain Region | X | | | M |
| 391 | Shrublands; *Melaleuca uncinata* thicket | X | | | M |
| 392 | Shrublands; *Melaleuca thyioides* thicket | X | | | H |
| 393 | Shrublands; *Melaleuca thyoides* thicket with scattered Casuarina obesa | X | | | L |
| 432 | Shrublands; *Acacia rostellifera* & *Melaleuca cardiophylla* thicket | X | | | L |
| 433 | Mosaic: Shrublands; *Acacia rostellifera* & *Melaleuca cardiophylla* thicket/Sparse low woodland; illyarrie | X | | | M |
| 551 | Shrublands; *Allocasuarina campestris* thicket | X | | | L |
| 631 | Succulent steppe with woodland and thicket; york gum over *Melaleuca thyoides* & samphire | X | | | L |
| 694 | Shrublands; scrub-heath on yellow sandplain banksia-xylomelum alliance in the Geraldton Sandplain & Avon-Wheatbelt Regions | X | | | L |
| 696 | Shrublands; casuarina & dryandra thicket with wandoo and powderbark wandoo | X | | | L |
| 697 | Shrublands; scrub-heath on lateritic sandplain in the southern Geraldton Sandplain Region | X | | | L |
| 748 | Shrublands; *Melaleuca thyoides* thicket with scattered river gum | X | | | M |
| 772 | Shrublands; *Acacia lasiocarpa* & *Melaleuca acerosa* heath | X | | | L |
| 936 | Medium woodland; salmon gum | X | | | H |
| 946 | Medium woodland; wandoo | X | | | H |
| 988 | Succulent steppe with thicket; *Melaleuca thyoides* over samphire | X | | | L |
| 999 | Medium woodland; marri | X | | | M |

| Beard Veg Assoc | Ecosystem Description | IUCN I-IV | Non-IUCN Reserve | CALM-Purchased Lease | Priority |
|---|---|---|---|---|---|
| 1026 | Mosaic: Shrublands; *Acacia rostellifera*, *A. cyclops* (S) & *Melaleuca cardiophylla* (N) thicket/Shrublands; *Acacia lasiocarpa* & *Melaleuca acerosa* heath | X | | | L |
| 1029 | Shrublands; scrub-heath Dryandra-Calothamnus assoc. with *B. prionotes* on limestone in the northern Swan Region | X | | | L |
| 1030 | Low woodland; *Banksia attenuata* & *B. menziesii* | X | | | L |
| 1031 | Mosaic: Shrublands; hakea scrub-heath/Shrublands; dryandra heath | X | | | L |
| 1032 | Mosaic: Medium woodland; marri, wandoo, powderbark/Shrublands; dryandra heath | X | | | L |
| 1034 | Medium woodland; marri, wandoo & powderbark | X | | | M |
| 1035 | Mosaic: Medium open woodland; marri/Shrublands; dryandra heath | X | | | H |
| 1036 | Low woodland; *Banksia prionotes* | X | | | L |
| 1044 | Mosaic: Medium woodland; York gum & salmon gum/Shrublands; *Melaleuca thyioides* thicket | X | | | L |
| 1149 | Shrublands; scrub-heath Acacia-Ecdeiocolia association in the south-east Geraldton Sandplain Region | X | | | M |
| 1032 | Lesueur-Coomallo Floristic Community D1 (Martinick & Associates 1988) | X | | | H |
| 1032 | Lesueur-Coomallo Floristic Community A1.2 (Martinick & Associates 1988) | X | | | L |
| 694 | Herbaceous plant assemblages on bentonite lake beds (Vegetation Types 1,2,3&7) and margins (Vegetation Types 4,5&6) of the Watheroo-Marchagee region (Griffin 1991) | X | | | H |
| 379 | Ferricrete floristic community (Rocky Springs type) (Griffin *et al.* 1983) | | | | H |
| 1031 | Lesueur-Coomallo Floristic Community M2 (Martinick & Associates 1988) | X | | | L |
| 1032 | Low heath dominated by *Petrophile chrysantha* on Lesueur Dissected Uplands (Griffin 1994) | X | | | L |
| 748 | Spring communities, Eneabba sandplain (D. Rose pers. comm.) | X | | | H |
| NA | Cave invertebrate communities of the Dongara area (R. Shepherd pers. comm.) | X | | | H |
| 1032 | Lesueur-Coomallo Floristic Community DFGH (Martinick & Associates 1988) | X | | | L |

L=Low, M=Medium, H=High.

## Subregional constraints in order of priority

(see Appendix B, key g)

Competing Land Uses: The primary issue in that agricultural activities occupies over 69% of the subregion.

Economic Constraints: In terms of the cost of land and the cost of subsequent management.

Other: Difficulties in identifying biodiversity values in some areas due to lack of resolution of data; level of degradation of much of the subregions is significant due to agricultural practices and the impacts of feral herbivores.

## Bioregional and subregional priority for reserve consolidation

GS is reservation Class 4 (see Appendix D, and Appendix C, rank 4) because 10 - 15% of its area reserved (any tenure). GS1 has 3.04% of the subregion in conservation reserves. GS2 has 13.84% of the subregion in conservation reserves. GS3 has 17.67% of the subregion in conservation reserves. GS2 has been extensively cleared for agricultural purposes leaving a biased reserve system and salinity problems are ubiquitous so Class 1 is more appropriate. Two reserves in the northern extremity of GS2 make up over 88% of the conservation estate. GS3 has also been extensively cleared in the eastern portion of the subregion and has salinity problems however reservation levels are higher and more widely spread over the landscape so Class 2 is more appropriate. GS1 has very little conservation estate however threats are less urgent (mainly relating to stock and feral animals) so Class 2 is appropriate.

## Reserve management standard

Many GS reserves are becoming saline or encountering rising water tables. Wildfire management facilities are limited by resources, except for fire breaks and fire-access tracks which are installed and maintained except on Zuytdorp Nature Reserve, areas of Beekeepers Nature Reserve and Nature Reserves smaller than 200 ha. Feral herbivore grazing activities now widespread (e.g. Callicivirus hasn't made a observable difference to rabbit numbers, goats are common in north and east, pigs are undergoing drastic increases in numbers and spread). Feral predator control systems are in place on Kalbarri, Badgingarra and Nambung National Parks only. The overall reserve management rank for GS3 is (i) (poor) (see Appendix C, rank 5).

# Off reserve conservation

## Priority species or groups

| Species | Specific Recovery Plan | General Recovery Plan |
|---|---|---|
| *Falco peregrinus* | No | Action Plan for Australian Birds |
| *Leipoa ocellata* | Malleefowl Preservation Society have current Action Plan and ongoing research | Action Plan for Australian Birds |
| *Calyptorhynchus latirostris* | RP | Action Plan for Australian Birds |

| | | |
|---|---|---|
| *Sminthopsis griseoventer boullangerensis* | No | Action Plan for Australian Monotremes and Marsupials |
| *Parantechinus apicalis* | IRP | Action Plan for Australian Monotremes and Marsupials |
| *Morelia spilota imbricata* | No | Action Plan for Australian Reptiles |
| *Simoselaps calonotus* | No | Action Plan for Australian Reptiles |
| *Egernia stokesii badia* | No | Action Plan for Australian Reptiles |
| *Acacia aprica* | IRP | No |
| *Acacia carens* | No | No |
| *Acacia chapmanii* subsp. *chapmanii* | No | No |
| *Acacia cochlocarpa* subsp. *cochlocarpa* | IRP | No |
| *Acacia congesta* subsp. *cliftoniana* | No | No |
| *Acacia flabellifolia* | No | No |
| *Acacia lanceolata* | No | No |
| *Acacia lasiocarpa* var. *lasiocarpa* Cockleshell Gully variant (EA Griffin 2039) | No | No |
| *Acacia recurvata* | No | No |
| *Acacia retrorsa* | No | No |
| *Acacia vassalii* | No | No |
| *Acacia vittata* | No | No |
| *Acacia wilsonii* | No | No |
| *Andersonia gracilis* | No | No |
| *Andersonia longifolia* | No | No |
| *Anigozanthos humilis* subsp. *grandis* ms | No | No |
| *Anigozanthos viridis* subsp. *terraspectans* | No | No |
| *Arnocrinum gracillimum* | No | No |
| *Baeckea* sp. Three Springs (ME Trudgen 5368) | No | No |
| *Boronia ramosa* subsp. *lesueurana* | No | No |
| *Boronia scabra* subsp. *condensata* | No | No |
| *Caladenia drakeoides* ms | IRP | No |
| *Calectasia browneana* | No | No |
| *Calectasia palustris* | No | No |
| *Calytrix platycheiridia* | No | No |
| *Catacolea enodis* | No | No |
| *Caustis gigas* ms | No | No |
| *Chamelaucium griffinii* ms | No | No |
| *Chorizema humile* | IRP | No |
| *Comesperma rhadinocarpum* | No | No |
| *Conospermum densiflorum* subsp. *unicephalatum* | No | No |
| *Corymbia chlorolampra* | No | No |
| *Dampiera tephrea* | No | No |
| *Darwinia chapmaniana* ms | No | No |
| *Daviesia bursarioides* | No | No |
| *Daviesia debilior* subsp. *debilior* | No | No |
| *Daviesia dielsii* | No | No |
| *Diuris* sp. Arrowsmith (K Dixon 924) | No | No |
| *Drakaea elastica* | No | No |
| *Drosera marchantii* subsp. *prophylla* | No | No |
| *Dryandra catoglypta* | No | No |
| *Dryandra cypholoba* | No | No |
| Species | Specific Recovery Plan | General Recovery Plan |
| *Dryandra serratuloides* subsp. *perissa* | No | No |
| *Eleocharis keigheryi* | No | No |
| *Eucalyptus absita* | No | No |
| *Eucalyptus absita x loxophleba* | No | No |
| *Eucalyptus angularis* | No | No |
| *Eucalyptus annuliformis* | No | No |
| *Eucalyptus balanites x* | No | No |
| *Eucalyptus crispata* | No | No |
| *Eucalyptus dolorosa* | No | No |
| *Eucalyptus johnsoniana* | No | No |
| *Eucalyptus lateritica* | No | No |
| *Eucalyptus leprophloia* | No | No |
| *Eucalyptus pruiniramis* | No | No |
| *Eucalyptus rhodantha* var. *petiolaris* | No | No |
| *Eucalyptus rhodantha* var. *rhodantha* | No | No |
| *Eucalyptus subangusta* subsp. *virescens* | No | No |
| *Eucalyptus suberea* | No | No |
| *Gompholobium* sp. Marchagee (BR Maslin 1427) *[aff. aristatum]* | No | No |
| *Goodenia xanthotricha* | No | No |
| *Grevillea althoferorum* | IRP | No |

| | | |
|---|---|---|
| *Grevillea batrachioides* | No | No |
| *Grevillea biformis* subsp. *cymbiformis* | No | No |
| *Grevillea bracteosa* | No | No |
| *Grevillea calliantha* | No | No |
| *Grevillea curviloba* subsp. *incurva* | IRP | No |
| *Grevillea delta* | No | No |
| *Grevillea humifusa* | No | No |
| *Grevillea metamorpha* | No | No |
| *Grevillea pinifolia* | No | No |
| *Grevillea synapheae* subsp. A Flora of Australia (SD Hopper 6333)] | No | No |
| *Grevillea synapheae* subsp. *minyolo* | No | No |
| *Hakea megalosperma* | No | No |
| *Hemiandra gardneri* | No | No |
| *Hydrocotyle coorowensis* | No | No |
| *Hypocalymma* sp. Cataby (GJ Keighery 5151) *[aff. tetrapterum]* | No | No |
| *Hypocalymma tenuatum* ms | No | No |
| *Hypocalymma xanthopetalum* var. *linearifolium* ms | No | No |
| *Hypolaena robusta* | No | No |
| *Jacksonia pungens* ms | No | No |
| *Jacksonia* sp. Badgingarra (H Demarz D6601) [sp. 14] | No | No |
| *Lasiopetalum miseryense* ms | No | No |
| *Lasiopetalum molle* subsp. *boothendarrense* ms | No | No |
| *Lasiopetalum ogilvieanum* | No | No |
| *Lepidium fasciculatum* | No | No |
| *Leucopogon obtectus* | No | No |
| *Leucopogon plumuliflorus* | No | No |
| *Leucopogon* sp. Badgingarra (R Davis 421) | No | No |
| *Loxocarya gigas* ms | No | No |
| *Malleostemon* sp. Cooljarloo (B Backhouse s.n. 16.11.88) | No | No |
| *Mesomelaena stygia* subsp. *deflexa* | No | No |
| *Myriocephalus suffruticosus* | No | No |
| *Onychosepalum microcarpum* | No | No |
| *Paracaleana dixonii* ms | No | No |
| *Patersonia spirafolia* | No | No |
| *Persoonia filiformis* | No | No |
| Species | Specific Recovery Plan | General Recovery Plan |
| *Phlebocarya pilosissima* subsp. *teretifolia* | No | No |
| *Ptychosema pusillum* | No | No |
| *Scaevola eneabba* | No | No |
| *Schoenus griffinianus* | No | No |
| *Scholtzia* sp. Eradu (RD Royce 8016) | No | No |
| *Spirogardnera rubescens* | No | No |
| *Stawellia dimorphantha* | No | No |
| *Stenanthemum limitatum* | No | No |
| *Stylidium aeonioides* | No | No |
| *Stylidium pseudocaespitosum* | No | No |
| *Stylidium tinkeri* | No | No |
| *Stylidium torticarpum* | No | No |
| *Synaphea endothrix* | No | No |
| *Synaphea lesueurensis* | No | No |
| *Synaphea oulopha* | No | No |
| *Synaphea quartzitica* | IRP | No |
| *Synaphea rangiferops* | No | No |
| *Synaphea sparsiflora* | No | No |
| *Tetratheca remota* | No | No |
| *Thelymitra stellata* | No | No |
| *Thomasia* sp. Green Hill (Paust 1322) | IRP | No |
| *Thomasia* sp. New Norcia (Cayser s.n. Nov 1918) | No | No |
| *Thryptomene* sp. Lancelin (ME Trudgen 14000) | No | No |
| *Tricoryne robusta* ms | No | No |
| *Verticordia blepharophylla* | No | No |
| *Verticordia luteola* var. *rosea* | No | No |

## Appropriate species recovery actions

| Species | Recovery Actions[1] | Recovery Descriptions |
|---|---|---|
| *Falco peregrinus* | i, ii, iii | Habitat retention through reserves or on other State lands or on private lands. |
| *Leipoa ocellata* | i, ii, iii, vii, xiv | Habitat retention through reserves or on other State lands or on private lands. Control of foxes and cats. Reduction in habitat degradation through grazing pressure. |
| *Calyptorhynchus latirostris* | i, ii, iii, vii, xiv | Habitat retention through reserves or on other State lands or on private lands. Control of foxes and cats. Reduction in habitat degradation through grazing pressure. |
| *Sminthopsis griseoventer boullangerensis* | i, vii, ix, xii | Habitat retention through reserves. Control of foxes and cats. Research into appropriate fire regimes is required. |
| *Parantechinus apicalis* | i, vii, ix, xii | Habitat retention through reserves. Control of foxes and cats. Research into appropriate fire regimes is required. |
| *Morelia spilota imbricata* | x, vii, xii, i | Control of feral predators such as foxes and cats. Research into threatening processes other than ferals (e.g. fire regime). Habitat retention through reserves or on other State lands or on private lands. |
| *Simoselaps calonotus* | x, vii, xii, i | Control of feral predators such as foxes and cats. Research into threatening processes other than ferals (e.g. fire regime). Habitat retention through reserves or on other State lands or on private lands. |
| *Egernia stokesii badia* | x, vii, xii, i | Control of feral predators such as foxes and cats. Research into threatening processes other than ferals (e.g. fire regime). Habitat retention through reserves or on other State lands or on private lands. |
| *Acacia aprica* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Acacia carens* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Acacia chapmanii* subsp. *chapmanii* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Acacia cochlocarpa* subsp. *cochlocarpa* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| Species | Recovery Actions[1] | Recovery Descriptions |
| *Acacia congesta* subsp. *cliftoniana* | i, ii, iii, ix, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Acacia flabellifolia* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Acacia lanceolata* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Acacia lasiocarpa* var. *lasiocarpa* Cockleshell Gully variant (EA Griffin 2039) | i, ii, iii, xii | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Acacia recurvata* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Acacia retrorsa* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Acacia vassalii* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Acacia vittata* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Acacia wilsonii* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Andersonia gracilis* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Andersonia longifolia* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Anigozanthos humilis* subsp. *grandis* ms | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Anigozanthos viridis* subsp. *terraspectans* | i, ii, iii, v, vii, xii | Habitat retention through reserves or on other State lands or on private lands. Control of herbivores (rabbits) required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Arnocrinum gracillimum* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Baeckea* sp. Three Springs (ME Trudgen 5368) | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Boronia ramosa* subsp. *lesueurana* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Boronia scabra* subsp. | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life |

| | | |
|---|---|---|
| *condensata* | | history requirements for all rare flora very limited and needs additional research. |
| *Caladenia drakeoides* ms | i, ii, iii, ix, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Calectasia browneana* | i, ii, iii, v, vii, xii | Habitat retention through reserves or on other State lands or on private lands. Control of herbivores (pigs, goats, rabbits) required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Calectasia palustris* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |

| Species | Recovery Actions[1] | Recovery Descriptions |
|---|---|---|
| *Calytrix platycheiridia* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Catacolea enodis* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Caustis gigas* ms | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Chamelaucium griffinii* ms | i, ii, iii, ix, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Chorizema humile* | i, ii, iii, ix, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of feral herbivores and weeds may be required at some populations. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Comesperma rhadinocarpum* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Conospermum densiflorum* subsp. *unicephalatum* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Corymbia chlorolampra* | i, ii, iii, ix, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Dampiera tephrea* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Darwinia chapmaniana* ms | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Daviesia bursarioides* | i, ii, iii, ix, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Daviesia debilior* subsp. *debilior* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Daviesia dielsii* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Diuris* sp. Arrowsmith (K Dixon 924) | i, ii, iii, v, ix | Habitat retention through reserves or on other State lands or on private lands. Fencing of populations required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Drakaea elastica* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Drosera marchantii* subsp. *prophylla* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Dryandra catoglypta* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Dryandra cypholoba* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Dryandra serratuloides* subsp. *perissa* | ix, xii | Management of fire regime required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eleocharis keigheryi* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |

| Species | Recovery Actions[1] | Recovery Descriptions |
|---|---|---|
| *Eucalyptus absita* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eucalyptus absita x loxophleba* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eucalyptus angularis* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eucalyptus annuliformis* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eucalyptus balanites x* | i, ii, iii, ix, xiii | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. Provision of education to gravel extraction workers. |
| *Eucalyptus crispata* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eucalyptus dolorosa* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eucalyptus johnsoniana* | i, ii, iii, vi, vii, xiii, ix | Habitat retention through reserves or on other State lands or on private lands. Control of various herbivores and weed species. Education of miners of the affect of their activities. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eucalyptus lateritica* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eucalyptus leprophloia* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Understanding of life history requirements for all rare flora very limited and needs additional research (particularly insect infestation). |
| *Eucalyptus pruiniramis* | i, ii, iii, vi, vii, xiii, ix | Habitat retention through reserves or on other State lands or on private lands. Control of various herbivores and weed species. Education of miners of the affect of their activities. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eucalyptus rhodantha* var. *petiolaris* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eucalyptus rhodantha* var. *rhodantha* | i, ii, iii, xii | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eucalyptus subangusta* subsp. *virescens* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Eucalyptus suberea* | v, viii | Fencing as exclosures, control of feral herbivores (rabbits, goats) |
| *Gompholobium* sp. Marchagee (BR Maslin 1427) *[aff. aristatum]* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Goodenia xanthotricha* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Grevillea althoferorum* | v, vii, xiii | Habitat retention through reserves or on other State lands or on private lands. Fencing to protect populations from rabbits, chemical overspray and track maintenance activities. Understanding of life history requirements for all rare flora very limited and needs additional research. Education of community. |
| *Grevillea batrachioides* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Grevillea biformis* subsp. *cymbiformis* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |

| Species | Recovery Actions[1] | Recovery Descriptions |
|---|---|---|
| *Grevillea bracteosa* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Grevillea calliantha* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Grevillea curviloba* subsp. *incurva* | i, ii, iii, v, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Fencing to protect populations from chemical overspray and track maintenance activities. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Grevillea delta* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Grevillea humifusa* | i, ii, iii, v, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Fencing to protect populations from rabbits, chemical overspray and track maintenance activities. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Grevillea metamorpha* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Grevillea pinifolia* | i, ii, iii, vi | Habitat retention through reserves or on other State lands or on private lands. Control of weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Grevillea synapheae* subsp. A Flora of Australia (SD Hopper 6333)] | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Grevillea synapheae* subsp. *minyolo* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Hakea megalosperma* | i, ii, iii | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Hemiandra gardneri* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Hydrocotyle coorowensis* | xi, xii, viii, vi | Research into hydrology of site and remedial actions required. Weed control required. |
| *Hypocalymma* sp. Cataby (GJ Keighery 5151) *[aff. tetrapterum]* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Hypocalymma tenuatum* ms | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Hypocalymma xanthopetalum* var. *linearifolium* ms | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Hypolaena robusta* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Jacksonia pungens* ms | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Jacksonia* sp. Badgingarra (H Demarz D6601) [sp. 14] | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Lasiopetalum miseryense* ms | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Lasiopetalum molle* subsp. *boothendarrense* ms | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |

| Species | Recovery Actions[1] | Recovery Descriptions |
|---|---|---|
| *Lasiopetalum ogilvieanum* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Lepidium fasciculatum* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Leucopogon obtectus* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Leucopogon plumuliflorus* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Leucopogon* sp. Badgingarra (R Davis 421) | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Loxocarya gigas* ms | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Malleostemon* sp. Cooljarloo (B Backhouse s.n. 16.11.88) | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Mesomelaena stygia* subsp. *deflexa* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Myriocephalus suffruticosus* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Onychosepalum microcarpum* | i, ii, iii, ix, vi, vii, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds and herbivores required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Paracaleana dixonii* ms | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Patersonia spirafolia* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Persoonia filiformis* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Phlebocarya pilosissima* subsp. *teretifolia* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Ptychosema pusillum* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Control of various herbivores required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Scaevola eneabba* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Schoenus griffinianus* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds and herbivores required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Scholtzia* sp. Eradu (RD Royce 8016) | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Control of goats required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Spirogardnera rubescens* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Stawellia dimorphantha* | i, ii, iii, ix, vii, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Control of various weeds & herbivores required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| Species | Recovery Actions[1] | Recovery Descriptions |
| *Stenanthemum limitatum* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Stylidium aeonioides* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Stylidium pseudocaespitosum* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Stylidium tinkeri* | i, ii, v, vi, viii, xii | Fencing of populations as exclosures. Control of feral herbivores. Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Stylidium torticarpum* | i, ii, v, vi, viii, xii | Fencing of populations as exclosures. Control of feral herbivores. Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Synaphea endothrix* | i, ii, v, vi, viii, xii | Fencing of populations as exclosures. Control of feral herbivores. Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. Management of fire regime required. |
| *Synaphea lesueurensis* | i, ii, v, vi, viii, xii | Fencing of populations as exclosures. Control of feral herbivores. Habitat retention through reserves or |

| | | |
|---|---|---|
| | | on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Synaphea oulopha* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Synaphea quartzitica* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Synaphea rangiferops* | i, ii, v, vi, viii, xii | Fencing of populations as exclosures. Control of feral herbivores. Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Synaphea sparsiflora* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Tetratheca remota* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Thelymitra stellata* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Thomasia* sp. Green Hill (Paust 1322) | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Thomasia* sp. New Norcia (Cayser s.n. Nov 1918) | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Thryptomene* sp. Lancelin (ME Trudgen 14000) | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Tricoryne robusta* ms | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Verticordia blepharophylla* | i, ii, iii, ix, vi, xii | Habitat retention through reserves or on other State lands or on private lands. Management of fire regime required. Control of various weeds required. Understanding of life history requirements for all rare flora very limited and needs additional research. |
| *Verticordia luteola* var. *rosea* | i, ii, iii, ix | Habitat retention through reserves or on other State lands or on private lands. Understanding of life history requirements for all rare flora very limited and needs additional research. |

[1]Appendix B, key h.

## Ecosystems and existing recovery plans

| Ecosystem | Ecosystem/Beard Vegetation Association | Specific Recovery Plan | General Recovery Plan |
|---|---|---|---|
| Lesueur-Coomallo Floristic Community D1 (Martinick & Associates 1988) | 1032 – Mosaic: Medium woodland: marri , wandoo, powderbark/Shrublands: dryandra heath | No | No |
| Lesueur-Coomallo Floristic Community A1.2 (Martinick & Associates 1988) | 1032 – Mosaic: Medium woodland: marri , wandoo, powderbark/Shrublands: dryandra heath | Yes - IRP | No |
| Herbaceous plant assemblages on bentonite lake beds (Vegetation Types 1,2,3&7) and margins (Vegetation Types 4,5&6) of the Watheroo-Marchagee region (Griffin 1991) | 694 – Shrublands: scrub-heath on yellow sandplain banksia-xylomelum alliance in the Geraldton Sandplains & Avon Wheatbelt Regions | No | No |
| Ferricrete floristic community (Rocky Springs type) (Griffin *et al.* 1983) | 379 – Shrublands: scrub-heath on lateritic sandplain in the central Geraldton Sandplain Subregion | No | No |
| Lesueur-Coomallo Floristic Community M2 (Martinick & Associates 1988) | 1031 – Mosaic: Shrublands: hakea scrub-heath/Shrublands dryandra heath | No | No |
| Low heath dominated by *Petrophile chrysantha* on Lesueur Dissected Uplands (Griffin 1994) | 1032 – Mosaic: Medium woodland: marri , wandoo, powderbark/Shrublands: dryandra heath | No | No |
| Spring communities, Eneabba sandplain (D. Rose pers. comm.) | 748 – Shrublands: Melaleuca thyoides thicket with scattered river gum | No | No |
| Cave invertebrate communities of the Dongara area (R. Shepherd pers. comm.) | NA | No | No |
| Lesueur-Coomallo Floristic Community DFGH (Martinick & Associates 1988) | 1032 – Mosaic: Medium woodland: marri , wandoo, powderbark/Shrublands: dryandra heath | No | No |

There are no specific regional recovery plans for any of the above biota / systems. Most species of flora have broad discussion of actions required to assist recovery detailed in the publication Declared rare and poorly known flora in the Moora District (Patrick and Brown 2001). Other Recovery Plans include; National Recovery Plan for Malleefowl (Benshemesh 2000), The Action Plan for Australian Birds (Garnett and Crowley 2001), Action Plan for Australian Marsupials and Monotremes (Maxwell *et. al* 1996), The Action Plan for Australian Reptiles (Cogger *et al.* 1993).

## Appropriate ecosystem recovery actions

| Ecosystem | Recovery Actions[1] | Recovery Description |
|---|---|---|
| Lesueur-Coomallo Floristic Community D1 (Martinick & Associates 1988) | i, ii, vi, vii, ix | Habitat protection through reserves including more reservation needed of high priority areas; Habitat protection on private lands; Weed control for critical habitats; Feral animal control of rabbits, goats and foxes; Fire management, especially of species with generations greater than 5-8 years. |
| Lesueur-Coomallo Floristic Community A1.2 (Martinick & Associates 1988) | i, ii, vi, vii, ix | Habitat protection through reserves including more reservation needed of high priority areas; Habitat protection on private lands; Weed control for critical habitats; Feral animal control of rabbits, goats and foxes; Fire management, especially of species with generations greater than 5-8 years. |
| Herbaceous plant assemblages on bentonite lake beds (Vegetation Types 1,2,3&7) and margins (Vegetation Types 4,5&6) of the Watheroo-Marchagee region (Griffin 1991) | i, iii, ii, v, vi, vii, ix | Habitat protection through reserves including more reservation needed of high priority areas; Habitat protection on state lands (UCL); Habitat protection on private lands; Fencing of sensitive areas (as exclosures) where there are heavy goat and/or rabbit numbers; Weed control for critical habitats; Feral animal control of rabbits, goats and foxes; Fire management, especially of species with generations greater than 5-8 years. |

| Ecosystem | Recovery Actions[1] | Recovery Description |
|---|---|---|
| Ferricrete floristic community (Rocky Springs type) (Griffin *et al.* 1983) | i, ii, vi, vii, ix | Habitat protection through reserves including more reservation needed of high priority areas; Habitat protection on private lands; Weed control for critical habitats; Feral animal control of rabbits, goats and foxes; Fire management, especially of species with generations greater than 5-8 years. |
| Ecosystem | Recovery Actions[1] | Recovery Description |
| Lesueur-Coomallo Floristic Community M2 (Martinick & Associates 1988) | i, ii, vi, vii, ix | Habitat protection through reserves including more reservation needed of high priority areas; Habitat protection on private lands; Weed control for critical habitats; Feral animal control of rabbits, goats and foxes; Fire management, especially of species with generations greater than 5-8 years. |
| Low heath dominated by *Petrophile chrysantha* on Lesueur Dissected Uplands (Griffin 1994) | i, ii, vi, vii, ix | Habitat protection through reserves including more reservation needed of high priority areas; Habitat protection on private lands; Weed control for critical habitats; Feral animal control of rabbits, goats and foxes; Fire management, especially of species with generations greater than 5-8 years. |
| Spring communities, Eneabba sandplain (D. Rose pers. comm.) | i, iii, ii, v, vi, vii, ix | Habitat protection through reserves including more reservation needed of high priority areas; Habitat protection on state lands (UCL); Habitat protection on private lands; Fencing of sensitive areas (as exclosures) where there are heavy goat and/or rabbit numbers; Weed control for critical habitats; Feral animal control of rabbits, goats and foxes; Fire management, especially of species with generations greater than 5-8 years. |
| Cave invertebrate communities of the Dongara area (R. Shepherd pers. comm.) | i, iii, ii, vi | Habitat protection through reserves including more reservation needed of high priority areas; Habitat protection on state lands (UCL); Habitat protection on private lands; Weed control for critical habitats. |
| Lesueur-Coomallo Floristic Community DFGH (Martinick & Associates 1988) | i, ii, vi, vii, ix | Habitat protection through reserves including more reservation needed of high priority areas; Habitat protection on private lands; Weed control for critical habitats; Feral animal control of rabbits, goats and foxes; Fire management, especially of species with generations greater than 5-8 years. |

[1]Appendix B, key h.

### Subregion priority for off reserve conservation

The subregional priority for off park conservation in GS3 has a rank of (ii) (see Appendix C, rank 6) indicating a large off-park effort is required

## Conservation actions as an integral part of NRM

### Existing NRM actions

| NRM Action[1] | Description | Effectiveness |
|---|---|---|
| Legislation | Soil conservation and land clearing legislation | Low. Not rigorously enforced, penalties ineffective. |
| Capacity Building | Bushcare Programme, leadership training for volunteer organizations. | Uptake low. |
| Other Planning Opportunities | Batavia Coast Regional Strategy, Local Government strategies for controlling development and assessing proposals | Low to moderate. Frequently discussion of NRM is minimal. |
| Integration with Property Management Planning, Catchment Planning and Landcare | Number of Land Conservation District Committees and the Northern Agricultural Catchment Council Regional Strategy (NACC). Regional NRM group (mixed Government, landholders and community representation). | Low to moderate. LCDC's largely inactive or focused on enterprise activities. NACC is poorly representative and with limited capacity currently. NACC strategy will set priorities for future funding opportunities with NHT2 and the National Action Plan for salinity. |

[1]Appendix B, key i.

### Feasible opportunities for NRM

Legislation: Requires more rigorous control.

Institutional Reform: e.g. rural reconstruction, industry reconstruction, new tenure and management arrangements.

Tradable Rights: Carbon credits would provide impetus to new revegetation efforts.

Other Planning Opportunities: Including local government planning and National Action Plan for Water Quality and Salinity. NACC strategy will set future funding opportunities with NHT2 and the National Action Plan for salinity. As fragmentation and decline of remnant vegetation is the top priority in this strategy, it provides an excellent opportunity to obtain funding for biodiversity.

Integration With Property Management Planning, Catchment Planning and Landcare: Increasing the role of NRM in all agricultural activities.

### Impediments or constraints to opportunities

A number of impediments exist. The current role of Government Departments in NRM and policing of activities such as land clearing is fragmented and unclear. Departments whose have responsibility for resource

exploitation may also have resource protection roles. Penalties for undertaking activities such as land clearing are comparatively minor and do not have the support of the greater rural community. Need to increase awareness of conservation values through education of various industries (mining, agricultural) and the public in general. Limited financial resources are also a major constraint.

### Subregions where specific NRM actions are a priority to pursue

The NRM priority for NRM actions in GS3 is (i) (see Appendix C, rank 7), indicating that there are major constraints. This is a similar situation to both AW1 & MAL2.

## Data gaps

### Gaps in data needed for the Identification of biodiversity values and management responses

Vegetation and Regional Ecosystem Mapping: No regolith mapping available for the subregion. Beards' vegetation is mapped at a resolution of 1:250 000. Diversity is so great that species composition changes occur over very small distances in Kwongan vegetation and this would only be evident at a high level of resolution.

Systematic Fauna Survey: Data is confined to vertebrates (but not birds) and selected invertebrate taxa, is sparse and has not been analysed yet (ca. 30 terrestrial quadrats and 10 wetland quadrats across subregions), quadrats only positioned on 10 of the most widespread surface-types, and only 2 – 3 quadrats per surface-type, few quadrats have been sampled on more than two occasions. Most reserves don't have long-term survey data on species presence or absence even for vertebrates.

Floristic Data: Although regional survey of flora has been completed, it is based on sparse sampling (about 70 quadrats across subregions), quadrats positioned on 10 most widespread surface-types.

Ecological and Life History Data: Currently little data available on habitat requirements of virtually all invertebrate species, most ephemeral plants, persisting CWR mammals, and uncommon vertebrate- and plant-species. There are no data to provide a regional context on life-history (including population-trend) of most species, including rabbits, cat, fox and CWR mammals.

Other Priority Data Gaps Include:

- No quantitative data on the effect of exotic predators, weed colonisation, fragmentation & farm clean-up, fire, mineral-extraction on gypsum and lime surfaces.
- No monitoring of the effect of salinity on species composition of communities is in place, although approximately 30 bench-mark quadrats are now established

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R = Report; J = Journal article; O = Other.

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