Yalgoo *(Yal)*

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Subregional description and biodiversity values

Description and area

This Bioregion has been extended westwards to the boundary of the South-west Botanical Province so that it now includes the Toolonga Plateau of the southern Carnarvon Basin. This region is an interzone between South-western Bioregions and Murchison. It is characterised by low woodlands to open woodlands of *Eucalyptus*, *Acacia* and *Callitris* on red sandy plains of the Western Yilgarn Craton and southern Carnarvon Basin. The latter has a basement of Phanerozoic sediments. Mulga, Callitris-*E. salubris*, and Bowgada open woodlands and scrubs on earth to sandy-earth plains in the western Yilgarn Craton. The subregion is particularly rich in ephemerals. The climate is arid to semi-arid warm Mediterranean and subregional area is 4, 858, 849ha.

Dominant land use

(see Appendix B, key b)

Grazing – native pastures. This accounts for the majority of land use in the subregion –76.97%.

Conservation- a significant proportion of conservation estate in the subregion falls outside the IUCN I-IV categories – 10.23%

UCL and Crown Reserves-9.35%

Mining – Interest in mining (gold in particular but also nickel and uranium) is considerable, however most mining leases still come under the pastoral lands act and as such are still required to be stocked.

Continental Stress Class

The Continental Stress Class of Yalgoo is 4. Continental Stress class should probably be considered 3, as the situation is similar to MUR1. Stress Class calculations were influenced by one large reserve (Toolonga Nature Reserve) located on the northern periphery of the Region.

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

Rare features:

- Tallering Peak Ironstone and jaspilite range - unique landform and vegetation complexes. For example *Eriostemon sericeus* and *Thryptomene decussata* low shrublands.
- Banded Ironstone Mt Gibson ranges. Contains a significant number of endangered flora.
- Warradagga Rock. Granite outcrop with endangered flora and invertebrates in ephemeral ponds.
- Mt Singleton Ranges. Number of endangered flora with some unusual vegetation types.

Rare Vertebrates:
Include: Western Spiny-tailed Skink (*Egernia stokesii badia*), Carnaby's Cockatoo (*Calyptorhynchus latirostris*) and Slender-billed Thornbill (*Acanthiza iredalei iredalei*).

Rare Flora:
Include: *Acacia vassalii*, *Darwinia masonii*, and *Eucalyptus crucis* subsp. *praecipua*.

Ecosystem Types Have at Least 85% of Their Total Extent Confined to the Yalgoo Subregion:

Beard Veg Code	Description
248	Shrublands; bowgada scrub with scattered red mallee & *Eucalyptus* sp.
337	Mosaic: Shrublands; bowgada scrub/Hummock grasslands, mixed sandplain - open red mallee & mixed sparse dwarf shrubs over *Triodia basedowii*
357	Medium woodland over scrub; York gum over bowgada & jam (*Acacia acuminata*)
358	Shrublands; bowgada & *Acacia quadrimarginea* on stony ridges
363	Shrublands; bowgada scrub with scattered cypress pine
364	Shrublands; bowgada scrub with scattered eucalypts & cypress pine
412	Succulent steppe with scrub; teatree (*Melaleuca thyioides*?) over samphire
414	Succulent steppe with open scrub; scattered bowgada & jam over saltbush & bluebush
416	Low woodland; mulga mixed with cypress pine & york gum
419	Shrublands; bowgada, jam and *Melaleuca uncinata* thicket
Beard Veg Code	Description
434	Shrublands; *Acacia quadrimarginea* & jam scrub with scattered York gum & *Allocasuarina huegeliana*
683	Succulent steppe with open scrub; scattered *Acacia sclerosperma* & snakewood over samphire

Centres of Endemism:
The region is rich and diverse in flora and fauna however most species are wide ranging and usually occur in at least one, and often several, adjoining regions.

Refugia:
Morton *et al* (1995) do not list any refugia in YAL, but potential for freshwater pools to be described as refugia for species requiring more mesic conditions.

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

In 1974 the Conservation Through Reserves Committee (CTRC) made recommendations for one reserve within the Yalgoo subregion in the CTRC Green Book (Conservation Through Reserves Committee 1974) This recommendation was implemented however it is widely recognised that this constitutes insufficient information and planning and requires further work.

In 2000 a report on the Biodiversity of the Southern Carnarvon Basin was published. This included a paper on reserve system gaps (McKenzie *et al.* 2000). The survey included Toolonga Nature Reserve in the far northern end of YAL, and therefore has some relevance to the Region.

The State Government's policy statement, Managing the Rangelands, broadly outlines the need to implement a CAR reserve system although no specific areas are targeted for reservation.

An unpublished report by Department of Conservation and Land Management on the Gascoyne - Murchison Strategy (Establishment and Management of a Conservation Reserve System) outlines the broad techniques to implement a CAR reserve system but does not target any specific areas. An outline of this report is given in the more comprehensive Filling the Gaps (McNamara et al., 2000).

Wetlands

Wetlands of National significance (DIWA listings)

Name and Code	Description[1]	Condition[2]	Trend[3]	Reliability[4]	Threatening Processes[5]
Thundelarra Lignum Swamp WA109 (YAL001WA)	B13	iii	vi	iii	iv, v (goats, foxes, cats & rabbits)
Wagga Wagga Salt Lake WA110 (YAL002WA)	B8, B12	ii	vi	iii	v (goats, foxes, cats & rabbits)

[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	Location	Description[1]	Special Values[2]	Condition[3]	Trend[4]	Reliability[5]	Threatening Processes[6]
Lake Moore	6 740 000m N, 580 000m E	B8	ii	iii	vi	i	iv, v (goats and sheep), x (hydrology changes due to degradation of surrounding vegetation types increasing runoff and siltation)
Lake Monger	6 730 000 m N, 480 000m E	B8	ii	iii	vi	i	iv, v (goats and sheep), x (hydrology changes due to degradation of surrounding vegetation types increasing runoff and siltation)

[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]
Murchison River	ii	iii	ii	iv, v (goats, foxes, rabbits), vi
Greenough River	ii	iii	ii	iv, v (goats, foxes, rabbits), vi

[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)

There are no Threatened Ecological Communities (TECs) in YAL.

Other ecosystems at risk

Community	Status	NVIS[1]	Condition[2]	Trend[3]	Reliability[4]	Threatening Processes[5]
Tallering Peak vegetation complexes. Ironstone range. Threatened by mining (E.P. Branch).	V	32	iii	iv	iii	xii (mining), v (goats)
Mt Gibson vegetation complex (G. Keighery and N. Gibson pers. comm.; Beard map).	V	21	ii-iii	iv	iii	iv, v (goats, rabbits), vii

Mt Singleton vegetation complex, Ninghan Station (A. Chant pers. comm.).		43	ii	ii	iii	v (goats), iv, vii
Plant assemblages dominated by *Acacia grasbyi* (miniritchie). Very widespread but only regenerates where no grazing (domestic or feral including rabbits) e.g. regeneration at Yuin mine reserve (J. Stretch pers. comm.).	V	21	ii	iii	ii	iv, v (goats, rabbits), vii
Sago Bush on narrow drainage lines of Tindelarra Land System. Narrow bands of alluvial soils that are degraded (J. Stretch pers. comm.).	V	31	i	iii	ii	iv, v (goats, rabbits), vii
Stony bluebush mixed shrubland (SBMS) of the Sandstone-Yalgoo-Paynes Find area (Payne *et al*. 1998)	V	31	ii	iii	ii	iv, v (goats, rabbits), vii
Drainage tract acacia shrubland (DRAS) of the Sandstone-Yalgoo-Paynes Find area (Payne *et al*. 1998)	V	21	ii	iii	ii	iv, v (goats, rabbits), vii
Alluvial plain snakewood chenopod shrubland (ASWS) of the Sandstone-Yalgoo-Paynes Find area (Payne *et al*. 1998)	V	22	ii	iii	ii	iv, v (goats, rabbits), vii
Breakaway footslope chenopod low shrubland of the Sandstone-Yalgoo-Paynes Find area (Payne *et al*. 1998)	V	31	ii	iii	ii	iv, v (goats, rabbits), vii
Lignum dominated plant assemblages of swamps of the Midwest e.g. at Thundelarra, Barnong Stations and Muggon (K. Tinley pers. comm.).	V	32	iii	iii	ii	iv, v (goats, rabbits), vii
Plant assemblages of high diversity landscapes and unusual landforms of Lake Wooleen	V	32	iii	iii	ii	iv, v (goats, rabbits), vii
Plant assemblages of high diversity landscapes and unusual landforms of silty sandy clay dunes on Muggon. Mt Gibson vegetation complex from NUR1 (p5).	V	32	iii	iii	ii	iv, v (goats, rabbits), vii
Invertebrate assemblages of Granite pools	V	NA	iii	iii	ii	iv, v (goats, rabbits), x (increased siltation due to grazing)
Critical weight range mammals (locally extinct species *Dasycercus cristicauda, Dasyurus geoffroii, Isoodon auratus*)	E	NA	i	ii - iii	iii	v (fox, cat), vii, iv

[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 2 (BIRDS)					
Calyptorhynchus latirostris	E	ii	iii	iv,	ii, v (foxes & cats), xii (poaching of nests)
Acanthiza iredalei iredalei	V	ii	iii	ii	vii
Leipoa ocellata	V	ii	iii	iii	v (foxes & cats), ii, iv
Species	Status	Condition[1]	Trend[2]	Reliability[3]	Threatening Processes[4]
SCHEDULE 1; RARE/LIKELY TO BECOME EXTINCT, DIV 3 (REPTILES)					
Egernia stokesii badia	E	ii	iii	ii	v (foxes & cats),ii
SCHEDULE 4; OTHER SPECIALLY PROTECTED FAUNA. DIVISION 2 (BIRDS)					
Cacatua leadbeateri mollis	SP	iii	iv	ii	ii, iv, xii (poaching of nests)
Falco peregrinus	SP	iii	iv	ii	ii

[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	Trend	Reliability	Threatening Processes
DECLARED RARE FLORA					
Eremophila viscida	CR	ii	vi	iii	xii (thought to be fire disturbance opportunist)
Acacia unguicula	E	Unknown	vi	iii	v (goats), iv
Acacia vassalii	E	Unknown	vi	iii	i, ii, vi
Darwinia masonii	E	Unknown	vi	iii	xii (mining), v (goats) iv
Eucalyptus crucis subsp. *praecipua*	E	Unknown	vi	ii	v (goats), iv
PRIORITY 1					
Acacia cerastes	1	Unknown	vi	iii	v (goats), iv
Genus sp. Yalgoo (JM Ward s.n. 11/7/1999)	1	Unknown	vi	ii	v (goats), iv
Micromyrtus sp. Ninghan (MG Corrick 9332)	1	Unknown	vi	ii	v (goats), iv, ii, vii
Sauropus sp. Woolgorong (M Officer s.n. 12/8/94)	1	Unknown	vi	iii	v (goats), iv

10/8/94)					
PRIORITY 2					
Hyalosperma stoveae	2	Unknown	vi	ii	v (goats), iv, vii
Lepidium merrallii	2	Unknown	vi	ii	v (goats), iv, vii
Melaleuca oldfieldii	2	Unknown	vi	ii	i, ii, iv, vi, vii, ix
Persoonia pentasticha	2	Unknown	vi	ii	i, ii, iv, vi, v (goats), ix
Stenanthemum poicilum	2	Unknown	vi	ii	iv, v (goats)

[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
10	Medium woodland; red mallee group				H
18	Low woodland; mulga (*Acacia aneura*)				M
19	Low woodland; mulga between sandridges				M
36	Shrublands; thicket, acacia-casuarina alliance ?species				M
39	Shrublands; mulga scrub				M
40	Shrublands; acacia scrub, various species	X			H
41	Shrublands; teatree scrub				L
120	Succulent steppe with open low woodland; mulga & sheoak				M
125	Bare areas; salt lakes		X		L
128	Bare areas; rock outcrops				L
141	Medium woodland; York gum, salmon gum & gimlet	X			H
142	Medium woodland; York gum & salmon gum				H
169	Shrublands; mulga & minnieritchie scrub	X			L
202	Shrublands; mulga & *Acacia quadrimarginea* scrub				H
204	Succulent steppe with open scrub; scattered mulga & *Acacia sclerosperma* over saltbush & bluebush				H
Beard Veg Assoc	Ecosystem Description	IUCN I-IV	Non-IUCN Reserve	CALM-Purchased Lease	Priority
205	Shrublands; *Acacia sclerosperma* & bowgada scrub				H
206	Shrublands; bowgada & grevillea scrub	X			L
221	Succulent steppe; saltbush				H
228	Shrublands; *Acacia quadrimarginea* scrub				H
240	Succulent steppe with open scrub; scattered *Acaica sclerosperma* & bowgada over saltbush & bluebush				H
243	Shrublands; bowgada & minnieritchie scrub				H
248	Shrublands; bowgada scrub with scattered red mallee & *Eucalyptus* sp.				H
256	Low woodland; York gum, and cypress pine (adjacent to e6pMLi)	X			L
266	Mosaic: Shrublands; bowgada scrub/Succulent steppe; saltbush & bluebush				M
268	Succulent steppe with open scrub; scattered *Acacia sclerosperma* over saltbush & bluebush				H
269	Low woodland over scrub; mulga over bowgada scrub				H
314	Succulent steppe with open woodland; york gum over saltbush				H
321	Mosaic: Shrublands; *Acacia sclerosperma* & bowgada scrub/Succulent steppe; saltbush & bluebush				M
326	Low woodland over scrub; mulga over bowgada & minnieritchie scrub			X	H
337	Mosaic: Shrublands; bowgada scrub/Hummock grasslands, mixed sandplain - open red mallee & mixed sparse dwarf shrubs over *Triodia basedowii*	X			L
352	Medium woodland; York gum				H
355	Shrublands; bowgada & jam scrub with scattered York gum & red mallee		X		H
357	Medium woodland over scrub; York gum over bowgada & jam (*Acacia acuminata*)				H
358	Shrublands; bowgada & *Acacia quadrimarginea* on stony ridges			X	H
361	Shrublands; bowgada & minnieritchie scrub with scattered mulga				H
362	Mosaic: Shrublands; bowgada & minnieritchie scrub with scattered mulga/Scattered groups of saltbush/bluebush	X			L
363	Shrublands; bowgada scrub with scattered cypress pine	X		X	L
364	Shrublands; bowgada scrub with scattered eucalypts & cypress pine	X	X	X	L

365	Shrublands; bowgada & jam scrub with scattered York gum & red mallee		X	X	M
374	Shrublands; bowgada scrub with scattered York gum				H
380	Shrublands; scrub-heath on sandplain				M
383	Shrublands; *Acacia rostellifera* scrub-heath				H
385	Shrublands; bowgada & jam scrub with scattered York gum				H
389	Succulent steppe with open low woodland; mulga over saltbush				L
404	Shrublands; bowgada & *Acacia murrayana* scrub				H
405	Shrublands; *Acacia sclerosperma*, bowgada & jam scrub				H
406	Shrublands; acacia, casuarina, *Eucalyptus eudesmioides*, *Banksia ashbyi* & other mixed species thicket				L
411	Succulent steppe with open scrub; scattered bowgada & jam over saltbush				H
412	Succulent steppe with scrub; teatree (*Melaleuca thyioides*?) over samphire				H
414	Succulent steppe with open scrub; scattered bowgada & jam over saltbush & bluebush				H
415	Succulent steppe with open scrub; scattered mulga & other wattle(s) over saltbush & bluebush			X	H
416	Low woodland; mulga mixed with cypress pine & york gum	X			H
Beard Veg Assoc	Ecosystem Description	IUCN I-IV	Non-IUCN Reserve	CALM-Purchased Lease	Priority
419	Shrublands; bowgada, jam and *Melaleuca uncinata* thicket		X	X	H
420	Shrublands; bowgada & jam scrub	X	X	X	H
423	Shrublands; Acacia scrub-heath unknown spp				H
434	Shrublands; *Acacia quadrimarginea* & jam scrub with scattered York gum & *Allocasuarina huegeliana*				H
437	Shrublands; Mixed acacia thicket on sandplain	X			L
483	Hummock grasslands, mixed sandplain - open mallee over sparse dwarf shrubs with spinifex; red mallee & mixed sparse dwarf shrubs over *Triodia basedowii*	X		X	H
533	Low woodland; mulga & cypress pine				L
551	Shrublands; *Allocasuarina campestris* thicket				L
631	Succulent steppe with woodland and thicket; york gum over *Melaleuca thyoides* & samphire		X		L
676	Succulent steppe; samphire			X	L
683	Succulent steppe with open scrub; scattered *Acacia sclerosperma* & snakewood over samphire				H
686	Medium woodland; York gum & red mallee			X	H
687	Shrublands; bowgada & jam scrub with scattered *Allocasuarina huegeliana* & York gum				H
863	Hummock grassland, mixed sandplain - sparse low trees over sparse dwarf shrubs with spinifex; red mallee over mixed dwarf shrubs with *Triodia scariosa* & T. sp?				H
936	Medium woodland; salmon gum				L
1063	Medium-Low woodland; York gum & cypress pine (*Callitris columellaris*)	X			L
1198	Mosaic: Succulent steppe with thicket; *Melaleuca thyoides* over samphire/Shrublands; bowgada open scrub				H
1241	Succulent steppe; bluebush				L
2081	Shrublands; bowgada and associated spp. scrub	X	X		L
2685	Shrublands; *Acacia quadrimarginea* & jam scrub on greenstone				H
	Tallering Peak vegetation complexes. Ironstone range.				H
	Mt Singleton vegetation complex, Ninghan Station				?
	Plant assemblages dominated by *Acacia grasbyi* (miniritchie).	X			M
	Sago Bush on narrow drainage lines of Tindelarra Land System.	X			H
	Stony bluebush mixed shrubland (SBMS) of the Sandstone-Yalgoo-Paynes Find area (Payne *et al*. 1998)				H
	Drainage tract acacia shrubland (DRAS) of the Sandstone-Yalgoo-Paynes Find area (Payne *et al*. 1998)				H
	Alluvial plain snakewood chenopod shrubland (ASWS) of the Sandstone-Yalgoo-Paynes Find area (Payne *et al*. 1998)				H
	Breakaway footslope chenopod low shrubland of the Sandstone-Yalgoo-Paynes Find area (Payne *et al*. 1998)				H
	Lignum dominated plant assemblages of swamps of the Midwest e.g. at Thundelarra, Barnong Stations and Muggon Station (K. Tinley pers. comm.).	X		X	H
	Plant assemblages of high diversity landscapes and unusual landforms of Lake Wooleen	X		X	H
	Plant assemblages of high diversity landscapes and unusual landforms of silty sandy clay dunes on Muggon. Mt Gibson vegetation complex p. 13 MUR1	X		X	L
	Invertebrate assemblages of Granite pools	X			H

Subregional constraints in order of priority
(see Appendix B, key g)

Competing Land Uses: Pastoralism occupies more than 76% of the region and mining also has considerable interests.

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

Other: There are difficulties in identifying biodiversity values in most areas due to lack of resolution of data; level of degradation of the region is significant due to pastoral practices and the impacts of feral herbivores

Bioregional and subregional priority for reserve consolidation

YAL is reservation class 4 (see Appendix D, and Appendix C, rank 4) with only 11.6% of area in conservation reserve (IUCN I-IV). Acquisitions of pastoral leases in the bioregion may increase the percentage of land in reserve. No subregions exist within YAL. The current reserve system is highly biased in terms of CAR criteria and is not comprehensive or representative in terms of ecosystem representation. The reserve system is heavily biased with one very large reserve (Toolonga Nature Reserve) in the extreme northern end of the subregion constituting over 80% of the reserved area. Therefore, Class 2 is more appropriate.

Reserve management standard

Toolonga Nature Reserve management rank is fair (ii) (see Appendix C, rank 5). Management actions are limited. No fire beaks or fire access tracks installed. Access is extremely limited to majority of reserve. No feral control programs are currently in place although goat numbers expected to be minimal due to lack of available water.

Kadji Kadji Timber Reserves management rank is poor (i). Management actions are limited. No fire beaks or fire access tracks are installed. No feral control program in place or knowledge of extent of problem. Grazing lease held over part of area.

Other areas under CALM management rank fair (ii). All other areas are pastoral leases or Unallocated Crown Land (ex pastoral lease). Management actions are limited. Fire breaks and fire access tracks are maintained. Control of goats (to varying extents) and reduction of sheep numbers carried out. No feral predator control programs in place.

Off reserve conservation

Priority species or groups and existing recovery plans

Species	Ecosystem (Beard Vegetation Association)	Specific Recovery Plan	General Recovery Plan
Leipoa ocellata	10 – Medium woodland: red mallee group; 19 – Low woodland: mulga between sandridges; 141 – Medium woodland: York gum, salmon gum & gimlet; 142 – Medium woodland: York gum & salmon gum	Malleefowl Preservation Society have current Action Plan and ongoing research	The Action plan for Australian Birds 2000
Cacatua leadbeateri mollis	19 – Low woodland: mulga between sandridges; 141 – Medium woodland: York gum, salmon gum & gimlet; 936 – Medium woodland: salmon gum; 686 – Medium woodland: York gum & red mallee	No	The Action plan for Australian Birds 2000 (Eastern state subspecies, though western form discussed)
Calyptorhynchus latirostris	19 – Low woodland: mulga between sandridges; 141 – Medium woodland: York gum, salmon gum & gimlet; 936 – Medium woodland: salmon gum; 686 – Medium woodland: York gum & red mallee	Yes - IRP	The Action plan for Australian Birds 2000
Acanthiza iredalei iredalei	240 – Succulent steppe with open scrub: scattered *Acacia sclerosperma* & bowgada over saltbush & bluebush; 266 – Mosaic: Shrublands, bowgada scrub/Succulent steppe, saltbush & bluebush; 268 – Succulent steppe with open scrub: scattered *Acacia sclerosperma* over saltbush and bluebush; 412 – Succulent steppe with scrub: teatree (*Melaleuca thyioides*) over samphire	No	The Action plan for Australian Birds 2000
Species	Ecosystem (Beard Vegetation Association)	Specific Recovery Plan	General Recovery Plan
Egernia stokesii badia	169 – Shrublands: mulga & minnieritchie scrub; 326 – Low woodland over scrub: mulga over bowgada & minnieritchie; 361 – Shrublands: bowgada & minnieritchie scrub with scattered mulga	No	The Action Plan for Australian Reptiles
Acacia cerastes	Unknown	No	No
Acacia unguicula	11 – Medium woodland: coolibah (*E. microtheca*)	No	No
Acacia vassalii	Unknown	No	No

Darwinia masonii	3 – Medium forest: jarrah-marri	No	No
Genus sp. Yalgoo (JM Ward s.n. 11/7/1999)	Unknown	No	No
Hyalosperma stoveae	Unknown	No	No
Lepidium merrallii	Unknown	No	No
Melaleuca oldfieldii	Unknown	No	No
Micromyrtus sp. Ninghan (MG Corrick 9332)	Unknown	No	No
Persoonia pentasticha	Unknown	No	No
Sauropus sp. Woolgorong (M Officer s.n. 10/8/94)	Unknown	No	No
Stenanthemum poicilum	12 – Medium woodland-tropical: stringybark (*E. tetrodonta*) & woollybutt (*E. miniata*)	No	No
Eucalyptus crucis subsp. *praecipua*	6 – Medium woodland: tuart & jarrah	No	No
CWR mammals	Various	Yes some have RPs or IRPs	The Action Plan for Australian Marsupials and Monotremes

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.
Cacatua leadbeateri mollis	i, ii, iii, vii	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	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
Leipoa ocellata	i, ii, iii, vii	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.
Acanthiza iredalei iredalei	i, ii, iii, vii	The loss of habitat through grazing of chenopod shrubland by sheep and rabbits needs to be addressed. Habitat retention through reserves or on other State lands or on private lands.
Egernia stokesii badia	i, ii, iii, xii	Little is known of habitat requirements or general natural history for this species so further research is important to determine its true status
Acacia cerastes	i, ii, iii, vii, ix, xii	Habitat retention through reserves or on other State lands or on private lands. Control of herbivores such as rabbits and goats required. Understanding of life history requirements for all rare flora very limited and requires additional research.
Acacia unguicula	i, ii, iii, vii, ix, xii	Habitat retention through reserves or on other State lands or on private lands. Control of herbivores (goats) required. Understanding of life history requirements for all rare flora very limited and needs additional research.
Acacia vassalii	xii	Understanding of life history requirements for all rare flora very limited and needs additional research.
Darwinia masonii	i, ii, iii, vii, xii,	Habitat retention through reserves or on other State lands or on private lands. Investigation of disturbance requirements for regeneration required. Control of herbivores such as rabbits and goats required. Understanding of life history requirements for all rare flora very limited and needs additional research.
Genus sp. Yalgoo (JM Ward s.n. 11/7/1999)	i, ii, iii, vii, xii	Habitat retention through reserves or on other State lands or on private lands. Feral animal control. Understanding of life history requirements for all rare flora very limited and needs additional research.
Hyalosperma stoveae	xii, vii	Investigation of disturbance requirements for regeneration required. Control of herbivores such as rabbits and goats may be required. Understanding of life history requirements for all rare flora very limited and needs additional research.

Species	Recovery Actions[1]	Recovery Descriptions
Lepidium merrallii	xii, vii	Investigation of disturbance requirements for regeneration required. Control of herbivores such as rabbits and goats may be required. Understanding of life history requirements for all rare flora very limited and needs additional research.
Melaleuca oldfieldii	i, ii, iii, vii, xii	Habitat retention and protection through reserves, on private lands and on other state lands. Control of herbivores such as rabbits and goats may be required. Investigation of disturbance requirements for regeneration required. Understanding of life history requirements for all rare flora very limited and needs additional research.
Micromyrtus sp. Ninghan (MG Corrick 9332)	i, ii, iii, vii, xii	Habitat retention through reserves or on other State lands or on private lands. Control of herbivores such as rabbits and goats required. Investigation of disturbance requirements for regeneration required. Understanding of life history requirements for all rare flora very limited and needs additional research.
Persoonia pentasticha	i, ii, iii, vii, xii,	Habitat retention through reserves or on other State lands or on private lands. Control of herbivores such as rabbits and goats may be required. Investigation of disturbance requirements for regeneration required. Understanding of life history requirements for all rare flora very limited and needs additional research.
Sauropus sp. Woolgorong (M Officer s.n. 10/8/94)	i, ii, iii, vii, xii	Habitat retention through reserves or on other State lands or on private lands. Control of herbivores such as rabbits and goats required. Investigation of disturbance requirements for regeneration required. Understanding of life history requirements for all rare flora very limited and needs additional research.
Stenanthemum poicilum	i, ii, iii, vi, viii, xii	Habitat retention through reserves or on other State lands or on private lands. Weed control. Control of herbivores such as rabbits and goats required. Investigation of disturbance requirements for regeneration required. Understanding of life history requirements for all rare flora very limited and needs additional research.
Eucalyptus crucis subsp. *praecipua*	i, ii, iii, vi, viii, xii	Habitat retention through reserves or on other State lands or on private lands. Weed control. Revegetation. Understanding of life history requirements for all rare flora very limited and needs additional research.
CWR mammals	x, vii, xii, i	Reintroduction to previous areas of habitat. Control of feral predators such as foxes and cats. Research into threatening processes other than ferals (e.g. fire regime). Habitat retention through reserves.

[1]Appendix B, key h.

Ecosystems and appropriate recovery actions

Ecosystem Description	Recovery Actions[1]	Recovery Description
Tallering Peak vegetation complexes. Ironstone range. Threatened by mining, see internal file (E.P. Branch).	i, iii, v, vi, vii, xii	Habitat protection through reserves. More reservation needed of high priority areas; Habitat protection on state lands (pastoral leases); Fencing of sensitive areas (as exclosures) where there are heavy goat numbers; Weed control for critical habitats; Feral animal control, mainly goats and foxes; Research into threatening processes, particularly effect of change in fire regime.
Mt Singleton vegetation complex, Ninghan Station (A. Chant pers. comm.).	xii, xiv, v, vii	Regular monitoring is occurring. Closing of water points in the Mt Singleton area. Fencing as exclosures. Feral animal control (goats).
Plant assemblages dominated by *Acacia grasbyi* (miniritchie). (J. Stretch pers. comm.).	i, iii, v, vi, vii, xii	Habitat protection through reserves. More reservation needed of high priority areas; Habitat protection on state lands (pastoral leases); Fencing of sensitive areas (as exclosures) where there are heavy goat numbers; Weed control for critical habitats; Feral animal control, mainly goats and foxes; Research into threatening processes, particularly effect of change in fire regime. The Narloo block (Narloo, Pt Yuin & Twin peaks) contains extensive areas of *A. grasbyi* habitat recently added to conservation estate.
Sago Bush on narrow drainage lines of Tindelarra Land System. (J. Stretch pers. comm.).	i, iii, v, vi, vii, xii	Habitat protection through reserves. More reservation needed of high priority areas; Habitat protection on state lands (pastoral leases); Fencing of sensitive areas (as exclosures) where there are heavy goat numbers; Weed control for critical habitats; Feral animal control, mainly goats and foxes; Research into threatening processes, particularly effect of change in fire regime. Large areas of Tindelarra land system on Narloo block. Not sure about area.
Stony bluebush mixed shrubland (SBMS) of the Sandstone-Yalgoo-Paynes Find area (Payne *et al*. 1998)	i, iii, v, vi, vii, xii	Habitat protection through reserves. More reservation needed of high priority areas; Habitat protection on state lands (pastoral leases); Fencing of sensitive areas (as exclosures) where there are heavy goat numbers; Weed control for critical habitats; Feral animal control, mainly goats and foxes; Research into threatening processes, particularly effect of change in fire regime.
Ecosystem Description	Recovery Actions[1]	Recovery Description
Drainage tract acacia shrubland (DRAS) of the Sandstone-Yalgoo-Paynes Find area (Payne *et al*. 1998)	i, iii, v, vi, vii, xii	Habitat protection through reserves. More reservation needed of high priority areas; Habitat protection on state lands (pastoral leases); Fencing of sensitive areas (as exclosures) where there are heavy goat numbers; Weed control for critical habitats; Feral animal control, mainly goats and foxes; Research into threatening processes, particularly effect of change in fire regime.
Alluvial plain snakewood chenopod shrubland (ASWS) of the Sandstone-Yalgoo-Paynes Find area (Payne *et al*. 1998)	i, iii, v, vi, vii, xii	Habitat protection through reserves. More reservation needed of high priority areas; Habitat protection on state lands (pastoral leases); Fencing of sensitive areas (as exclosures) where there are heavy goat numbers; Weed control for critical habitats; Feral animal control, mainly goats and foxes; Research into threatening processes, particularly effect of change in fire regime.
Breakaway footslope chenopod low shrubland of the Sandstone-Yalgoo-Paynes Find area (Payne *et al*. 1998)	i, iii, v, vi, vii, xii	Habitat protection through reserves. More reservation needed of high priority areas; Habitat protection on state lands (pastoral leases); Fencing of sensitive areas (as exclosures) where there are heavy goat numbers; Weed control for critical habitats; Feral animal control, mainly

		goats and foxes; Research into threatening processes, particularly effect of change in fire regime.
Lignum dominated plant assemblages of swamps of the Midwest e.g. at Thundelarra, Barnong Stations and Muggon Station. (K. Tinley pers. comm.).	i, iii, v, vi, vii, xii	Habitat protection through reserves. More reservation needed of high priority areas; Habitat protection on state lands (pastoral leases); Fencing of sensitive areas (as exclosures) where there are heavy goat numbers; Weed control for critical habitats; Feral animal control, mainly goats and foxes; Research into threatening processes, particularly effect of change in fire regime.
Plant assemblages of high diversity landscapes and unusual landforms of Lake Wooleen	i, iii, v, vi, vii, xii	Habitat protection through reserves. More reservation needed of high priority areas; Habitat protection on state lands (pastoral leases); Fencing of sensitive areas (as exclosures) where there are heavy goat numbers; Weed control for critical habitats; Feral animal control, mainly goats and foxes; Research into threatening processes, particularly effect of change in fire regime.
Plant assemblages of high diversity landscapes and unusual landforms of silty sandy clay dunes on Muggon.	vii, ix, i, v	Removal of grazing pressure by stock, goats and rabbits; Fire management; Habitat retention through reserves; Fencing of sensitive areas (as exclosures).
Mt Gibson vegetation complex from MUR1 p. 19.		
Invertebrate assemblages of Granite pools	i, iii, v, vi, vii, xii	Habitat protection through reserves. More reservation needed of high priority areas; Habitat protection on state lands (pastoral leases); Fencing of sensitive areas (as exclosures) where there are heavy goat numbers; Weed control for critical habitats; Feral animal control, mainly goats and foxes; Research into threatening processes, particularly effect of change in fire regime.

[1]Appendix B, key h.

Existing ecosystem recovery plans

There are no specific regional recovery plans for any of the above biota or 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 Geraldton District (Patrick 2001). Other Recovery Plans include; National Recovery Plan for Malleefowl (Benshemesh 2000); The Action Plan for Australian Birds 2000 (Garnett and Crowley 2000); Action Plan for Australian Marsupials and Monotremes (Maxwell *et al.* 1996); The Action Plan for Australian Reptiles (Cogger 1993).

Subregion priority for off reserve conservation

The bioregional priority for off park conservation is (ii) (see Appendix C, rank 6), indicating that there is a significant off park effort needed, resource constraints exist, and there is limited community capacity.

Conservation actions as an integral part of NRM

Existing NRM actions

Institutional Reform: Through the Gascoyne Murchison Strategy; Purchase of leases for conservation estate.

Threat Abatement Planning as Part of NRM: e.g. vegetation management plans and pest management.

Industry Codes of Practice: Particularly in relation to pastoral, mining and exploration activities.

Environmental Management Systems and Ecologically Sustainable Product Marketing

Integration with Property Management Planning, Catchment Planning and Landcare: Through Land Care District committees through the region.

Feasible opportunities for NRM

Legislation: Including duty of care for leasehold and other lands.

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

Other Planning Opportunities: Including local government planning and National Action Plan for Water Quality and Salinity.

Environmental Management Systems and Ecologically Sustainable Product Marketing: Some pastoral areas are attempting to identify and implement ecologically sustainable practices through the EMU process developed by the Regional Environmental Management Program of Gascoyne-Murchison Strategy. Requires a greater level of support to be successful.

Impediments or constraints to opportunities

A number of impediments exist including the Land Administration Act and operations of the Pastoral Land Board. Both the act and the Pastoral Land Board have requirements of Pastoral Leases that may not be consistent with conservation. Conservation through reserves is limited by the presence of mining leases and tenements. There is a need to increase awareness of conservation values through education of major 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

Yalgoo has an NRM priority of (i) (see Appendix C, rank 7) indicating that there are major constraints to implement effective NRM actions to achieve biodiversity outcomes. Grazing by sheep, cattle, feral goats, rabbits and the effects of fire has altered significant parts of vegetation communities within YAL. Certain preferred

and sensitive landscapes are severely degraded and will require rehabilitation programs of decadal time scales. Under the pastoral lands act leases are still required to maintain certain stock levels that do not necessarily fit with conservation values. Pastoral Industry reform is essential to achieve desired conservation outcomes.

Data gaps

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

Vegetation and Regional Ecosystem Mapping: No regolith mapping available. Regional ecosystem mapping has occurred at the broad scale; 1:1 000 000 for Beard's vegetation types and 1:500 000 for land systems by Department of Agriculture (Payne et al., 1998).

Systematic Fauna Survey: No data except for Toolonga Nature Reserve in the north western periphery of the subregion (Burbidge et al., 1980) and the White Wells area in the southern periphery (Burbidge et al., 1989). Reserves don't have long-term survey data on species presence or absence, even for vertebrates. Wetland survey has been minimal.

Floristic Data: Data is sparse, quadrats positioned on widespread surface-types as well as some of the localised substrates of particular interest. Department of Agriculture monitoring system offers quantitative information on spatial shifts within vegetation communities. Wetland survey has been minimal.

Ecological and Life History Data: There is little data on habitat requirements of virtually all invertebrate species, most ephemeral plants and uncommon vertebrate and plant species. There is no data to provide a regional context on life-history (including population-trend) of any species, even goats, foxes and rabbits.

Other Priority Data Gaps Include:

- No quantitative data on the effect of exotic predators, weed colonisation.
- No quantitative data on the effect of mineral extraction, pastoralism on landscape processes. Department of Agriculture has had monitoring sites installed since 1958 throughout Yalgoo. Rangeland survey provides a quantitative benchmark for reassessment by Department of Agriculture pastoral inspectors.
- No quantitative data on the impact of exotic herbivores on aquatic systems, or other communities, especially effects on invertebrate and non-vascular plant communities.
- No quantitative data on the impact of weed colonisation (especially buffel grass) on riverine and other grassland communities, particularly upon recruitment of perennial species, and consequent effects on invertebrate and vertebrate communities.
- Poor understanding of the long-term impact of mining below water tables, particularly with respect to leaving flooded voids subject to salination.
- Poor understanding of subregional troglofaunas, particularly stygofauna associated with palaeo-drainage calcretes.

Sources

References cited

No.	Author	Date	Title	Publication Details	Pub. Type
090	Benshemesh, J.	(2000).	National Recovery Plan for Malleefowl.	Department of Environment and Heritage, South Australia.	R
142	Cale, B.	(2000a).	Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*). Draft Recovery Plan Recovery Plan No. //.	Department of Conservation and Land Management.	R
181	Cogger, H., Cameron, E., Sadlier, R. and Eggler, P.	(1993).	The Action Plan for Australian Reptiles.	Australian Nature Conservation Agency, Canberra.	R
190	Conservation Through Reserves Committee	(1974).	Conservation Reserves in Western Australia. Systems 1, 2, 3, 4, 5, 8, 9, 10, 11, 12 . Report of the Conservation Through Reserves Committee to the Environmental Protection Authority.	Department of Conservation and Environment (WA).	R
298	Garnett, S.T. and Crowley, G.M.	(2000).	The Action Plan for Australian Birds.	Environment Australia, Canberra.	R
483	Maxwell, S., Burbidge, A.A. and Morris, K. (eds).	(1996).	The 1996 Action Plan for Australian Marsupials and Monotremes. Wildlife Australia Endangered Species Program Project Number 50.	Environment Australia, Canberra.	R
710	McKenzie, N.L., Halse, S.A. and Gibson, N.	(2000).	Some gaps in the reserve system of the southern Carnarvon Basin, Western Australia.	Records of the Western Australian Museum Supplement No. 61: 511-546.	R
498	McNamara, P., Brandis, T and Hopkins, A.	(2000).	Filling the gaps.	Landscope. 15 (4) 43 - 49.	J
519	Morton S.R., Short, J. and Barker, R.D. with an Appendix by Griffin, G.F. and Pearce, G.	(1995).	Refugia for Biological Diversity in Arid and Semi Arid Australia. Biodiversity Series, Paper No 4. Biodiversity Unit.	Department of Environment Sport and Territories. Canberra	R
537	Patrick, S.J.	(2001).	Declared Rare and Poorly Known Flora in the Geraldton District. Wildlife Management Program No. 26.	Department of Conservation and Land Management.	R
542	Payne, A.L., Van Vreeswyk, A.M.E., Pringle, H.J.R., Leighton, K.A., and Hennig, P.	(1998).	Technical Bulletin No 90., An inventory and condition survey of the Sandstone-Yalgoo-Paynes Find area, Western Australia.	Agriculture Western Australia.	R

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

Other relevant publications

See reference numbers 026, 065, 075, 090, 094, 098, 101, 110, 118, 127, 137, 142, 181, 190, 191, 241, 267, 268, 272, 273, 278, 279, 298, 299, 357, 371, 372, 381, 387, 391, 395, 405, 406, 407, 419, 429, 450, 451, 459, 483, 498, 507, 519, 526, 542, 584, 641, 650, 679, 685, 709 and 710 in Appendix A.