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Nomination *(to be completed by nominator)*

Current conservation status	
Name of ecological community:	Dense shrublands on clay flats (floristic community type 9 as originally described in Gibson et al. (1994))
Other names:	SCP09
Description:	The community occurs as shrublands or open woodlands on clay flats that are inundated for long periods. It has been recorded between Moore River National Park and Dunsborough. Sedges are more apparent in the community than in other claypans, generally with moderate frequencies of *Chorizandra enodis*, *Cyathochaeta avenacea*, *Lepidosperma longitudinale* and *Leptocarpus coangustatus*. The community has a lower species richness and weed frequency than other claypan threatened ecological communities. The community is also known as "floristic community type 9" as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) "A floristic survey of the southern Swan Coastal Plain" (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).
Nomination for:	Listing ☒ Under BC Act Change of status ☐ Delisting ☐

1. *Is the ecological community currently on any conservation list, either in a State or Territory, Australia or Internationally?* 2. *Is it present in an Australian jurisdiction, but not listed?*	*Provide details of the occurrence and listing status for each jurisdiction in the following table*

Jurisdiction	**List or Act name**	**Date listed or assessed (or N/A)**	**Listing category eg. critically endangered (or none)**	**Listing criteria eg. B1ab(iii)+2ab(iii) (or none)**
National	EPBC Act	27/03/2012	Critically Endangered under the umbrella TEC 'Clay pans of the Swan Coastal Plain'	
Western Australia	Current ranking under WA Minister ESA list in policy	6/11/2001	Vulnerable	VU B)
	Priority list		1 ☐ 2 ☐ 3 ☐ 4 ☐	
Other State/Territory				

Nominated conservation status: category and criteria (include recommended status for deleted ecological communities)

Critically endangered (CR) ☐ Endangered (EN) ☒ Vulnerable (VU) ☐ Collapsed (CO) ☐

Priority 1 ☐ Priority 2 ☐ Priority 3 ☐ Priority 4 ☐ None ☐

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What criteria support the conservation status category for listing as a threatened ecological community or collapsed ecological community? *Refer to Section 32 of the Biodiversity Act 2016 for definition of 'Collapsed', and Appendix 3 table 'IUCN Red List Criteria for ecosystems version 2.2'.*	EN under B1a(iii),b; B2a(iii),b

Eligibility against the criteria

*Provide justification for the nominated conservation status; is the ecological community eligible or ineligible for listing against the five criteria. For **delisting**, provide details for why the ecological community no longer meets the requirements of the current conservation status.*

A.	Reduction in geographic distribution *(evidence of decline)*	☐ **A1** ☐ **A2a** ☐ **A2b** ☒ **A3** CR, EN, VU are plausible. VU is most robust
	Justification of assessment under Criterion A.	For criteria A and B, the community is assumed to collapse when the mapped distribution declines to zero (see Appendix 2 for distribution map). • Gibson *et. al* (1994) lists communities that are thought to have declined by >90% based on their analysis of the level of clearing of vegetation on the geomorphologies and landforms that support the community. This clay pan type was included in that group. • The proportion that remains of the pre-1750 extent of the vegetation complexes in which the community occurs is provided in statistical data in Government of Western Australia (2019). • The reduction in extent of native vegetation in the vegetation complexes on the Swan Coastal Plain that support the community is assumed to be indicative of the level of clearing of the community (see Appendix 3 for detailed data on clearing of vegetation complexes). • The following vegetation complexes support the community, with the proportion cleared in brackets: Bassendean Complex North (28%), Guildford (95%), Serpentine River (90%), Bassendean Complex Central and South (75%), Karrakatta complex Central and South (75%), and Southern River Complex (80%). • The range of values for the level of clearing of vegetation complexes that support the community is 28-95% (Government of Western Australia 2019). • The timing of the vegetation clearing is not known so is conservatively inferred to be since 1750. • Threshold for level of clearing since 1750 to meet CR is ≥90%, for EN is ≥70%, and for VU is ≥50%. • Community plausibly meets rank for CR, EN, VU or Does Not Meet under criterion A3. • VU under A3 is a reasonably conservative rank as vegetation clearing data are regional and not sufficiently corroborated in relation to this community to support a higher rank.

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B.	Restricted geographic distribution *(EOO and AOO, number of locations and evidence of decline)*	☒ **B1** (specify at least one of the following): ☐ **a)(i)** ☐ **a)(ii)** ☒ **a)(iii)** ☒ **b)** ☐ **c);** ☒ **B2** (specify at least one of the following): ☐ **a)(i)** ☐ **a)(ii)** ☒ **a)(iii)** ☒ **b)** ☐ **c);** ☐ **B3 (only for Vulnerable Listing)**
	Justification of assessment under Criterion B.	• B1: EOO is 5470km^2. Community meets the threshold for Endangered as it occupies ≤20,000km^2 (threshold for EN is ≤20,000km^2 and for CR is ≤2,000km^2). • B1aiii) Community is subject to measurable decline from observed and inferred ongoing weed invasion (ie biotic interactions, see criterion D, and Appendix 1 below). • B1b) Continuing decline observed and inferred from the historic and ongoing impacts of land clearing, hydrological change (alterations to surface water), weed invasion, altered fire regimes, grazing by introduced fauna, and a drying and warming climate that are likely to cause continuing decline in geographic distribution and environmental quality within the next 20 years (see Appendix 1 for details of threats). • B2: AOO is 1000km^2 (occupies 10 10x10 km^2 grid cells). Community meets threshold for endangered with ≤20 cells occupied (threshold for CR is ≤2 grid cells)**.** • B2aiii) Community subject to measurable decline from observed and inferred ongoing weed invasion (as for B1aiii). • B2b): As for B1b, continuing decline observed and inferred from the historic and ongoing impacts of threats likely to cause continuing decline in geographic distribution and environmental quality, and disruption to biotic processes, within the next 20 years. • B1c: Community is considered to occur at 9 threat-defined locations based on clusters of bushland areas subject to similar management, and threats. Threshold for VU is ≤10 threat-defined locations. Meets VU under B1c, B2c. • Community exists at more than 5 threat-defined locations. Does not meet B3. • **Meets criteria for Endangered B1aiii, B1b, B2aiii and B2b and Vulnerable for B1c and B2c**
C.	Environmental degradation of abiotic variable *(Evidence of decline over 50-year period)*	☐ **C1** ☐ **C2** ☐ **C3**

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	Justification of assessment under Criterion C.	• Altered hydrology is a significant abiotic variable affecting the community. Alterations to depths or seasonality of surface water will result in subsequent changes to composition, in particular to the defining herbaceous layer in the community. • For criterion C, it is assumed the community will collapse when seasonal inundation with surface water no longer occurs. It is assumed that such severe changes to surface water will results in loss of the defining herbaceous wetland adapted flora in the community. Reductions and other changes to seasonal inundation patterns are directly related to rainfall (See Appendix 1 for further details). • There are inadequate quantitative data to link changes to surface water regimes (depths and seasonality) to compositional changes in the community. Bore data of groundwater levels are available for occurrence PINJ03 within crown reserve 41184 Reserve, however, there is a lack of connection between groundwater and surface water. • It is therefore not possible to determine the severity of current or projected declines in rainfall and surface water in relation to the collapse state (also see Appendix 1 for details of threats)**.** • There are inadequate data to determine if community meets minimum thresholds for proportion of the extent (≥30%) or proportional severity of degradation (≥30%) over any 50 year period, or (≥50%) or proportional severity of disruption of abiotic processes (≥50%) since 1750 to meet the criteria for VU. • **Insufficient evidence to determine if the community meets criterion C**
D.	Disruption of biotic processes or interactions *(Evidence of decline over 50-year period)*	☐ **D1** ☒ **D2** ☐ **D3**
	Justification of assessment under Criterion D.	• Weed invasion is a significant biotic threat to the community. • The severity of weed invasion associated with collapse is uncertain, but it is assumed conservatively that the community reaches a collapsed state when only 10% (plausible range 0–20%) of its plant species are native. • Weed data taken from 3 quadrats across 3 occurrences (BYRD01,WELR02, MANEA01) (representative of 23% of the extent of the 13 occurrences in the community) indicate an increase from 6.7% to 19.3% of introduced/exotic species between 1994 to 2017-2018 respectively, with a reduction of native taxa in the same period of 12.6 %. • It is assumed that the increase in introduced taxa as indicated by 3 quadrats is linear and is representative of weed invasion across the occurrences in which the specific quadrats occur. Based on these assumptions, 23% of the extent of the community has a projected 27% decline in native taxa in the next 50 years. This represents a projected reduction to the proportion of native species to 53.2% (ie 46.8% are weed taxa) across 23% of the extent of the community over the next 50

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		years. This corresponds to a projected 23% severity in relation to the collapse point of ≥90% weeds (ie 47/90 x100%), within the next 50 years, in the absence of effective weed management. • Based on available weed monitoring data, the community does not meet the threshold of ≥30% of the extent of the community subject to relative severity of weed invasion of ≥80% to meet VU under criterion D2a. • **Available weed data do not indicate that the community meets criterion D.**
E.	Quantitative analysis *(statistical probability of ecosystem collapse)*	• No quantitative estimates of the risk of ecosystem collapse. • Unable to assess

Reasons for change of status

Genuine change ☐ New knowledge ☐ Previous mistake ☐ Review/Other ☒

Provide details: The community was initially ranked as Vulnerable using ranking criteria developed in WA that differ to those in the IUCN Red List Criteria for Ecosystems (version 2.2).

Summary of assessment information *(provide detailed information in the relevant sections of the nomination form)*

EOO	5470 km^2	AOO	1000 km^2 (10 10x10km grid method).
No. locations	13	Severely fragmented	Yes ☒ No ☐ Unknown ☐
Current known area			Known from 13 occurrences covering 205ha.
Pre-industrialisation extent or its former known extent (if known)			Range of level of clearing of vegetation complexes that support the community is 28-95% (ie 5-72% remaining). Based on this estimate of original area ranges from 4,100ha (100/5x205ha) to 248ha (100/72x205).
Estimated percentage decline			Gibson et. al. (1994) states that the range contraction for this community is likely to be >90%, based upon geomorphological units the claypans fall within, that have historically been cleared. Range of level of clearing of vegetation complexes that support the community is 28-95%.

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Table 1: Summary assessment against IUCN RLE Criteria

Criterion	Rank indicated	Overall conclusion
A1	-	• Available data do not indicate community meets criterion
A2a	-	• Available data do not indicate community meets criterion
A2b	-	• Available data do not indicate community meets criterion
A3	CR, EN, VU or Does Not Meet	• Plausibly meets criteria for CR, EN, VU or Does Not Meet based on clearing levels in vegetation complexes that support the community. VU is most robust.
B1a	EN	• Measurable decline due to observed and inferred ongoing weed invasion. • Meets criterion for B1a(iii)
B1b	EN	• EOO is ≤20,000km^2 • Known and inferred threats are likely to cause continuing declines in geographic distribution, environmental quality and biotic interactions within the next 20 years. • Meets criterion for EN B1b
B1c	VU	• EOO is ≤20,000km^2 • Community exists at less than 10 threat-defined locations. • Meets criteria for B1c
B2a	EN	• Measurable decline due to observed and inferred ongoing weed invasion. • Meets criterion for B2a(iii)
B2b	EN	• AOO is 10 grid cells • Known and inferred threats are likely to cause continuing declines in geographic distribution, environmental quality and biotic interactions within the next 20 years. • Meets criterion for EN B2b
B2c	VU	• Ecosystem exists at less than 10 threat-defined locations. • Meets criteria for B2c
B3	-	• Known from more than 5 threat-defined locations. • Does not meet criterion
C1	-	• Inadequate data to determine if community meets minimum thresholds for proportion of the extent (≥30%) or proportional severity of degradation (≥30%) over past 50 years to meet VU.
C2	-	• Inadequate data to determine if community meets the threshold for proportion of the extent (≥30%) for proportional severity (≥30%) over any 50-year period to meet VU under C2b.
C3	-	• Inadequate data to determine if community meets the minimum thresholds for proportion of the extent (≥50%) or proportional severity of disruption of abiotic processes (≥50%) since 1750 to meet VU.
D1	-	• Available data about weed invasion do not meet minimum thresholds for proportion of the extent (≥30%) or proportional severity of disruption of biotic processes (≥30%) over past 50 years to meet VU.
D2	-	• Available data do not indicate if community meets the threshold proportion of the extent and severity of disruption of biotic processes (≥30%) for weed invasion over a 50-year period to meet VU.
D3	-	• Inadequate data to determine if community meets minimum thresholds for proportion of the extent (≥50%) or proportional severity of disruption of biotic processes (≥50%) since 1750 to meet VU.
E	NA	• No quantitative estimates of the risk of ecosystem collapse.

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		Plausibly meets CR, EN, VU or Does not Meet under A3 but VU under A3 is considered conservative. Meets criteria for EN under B1a(iii),b; B2a(iii),b. Meets VU under B1c, B2c. *The highest risk category obtained by any of the assessed criteria will be the overall risk status of the ecosystem'* (IUCN RLE Guidelines V1.1 page 42). **Meets EN under B1a(iii),b; B2a(iii),b.**

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Summary of location (occurrence) information *(provide detailed information in the relevant sections of the nomination form)*						
Occurrence	Land tenure	Survey information: date of survey. Note: Survey by DBCA unless otherwise stated.	Condition	Area of occurrence (ha)	Threats *(note if past, present or future)*	Specific management actions
Occurrence 1 DUCK03	Vacant Crown Land	03/11/1994, 19/08/2008, 06/06/2010, 21/10/2010, 06/11/2014	Very Good 50% Excellent 50% in 2014.	0.3	Vegetation clearing Too frequent fire Weed invasion	
Occurrence 2 BRICK04	Brickwood Reserve, Shire of Serpentine Jarrahdale	15/12/1994 2/11/2005 Boundary remapped 2006. Further survey 29/09/2011 and 28/6/2012	90% Excellent, 10% Good in 2011. 100% Excellent in 2012	3.1ha	Vegetation clearing Too frequent fire Weed invasion	
Occurrence 3 YARL02	Drainage and Camping Reserve C22215, Yarloop, Shire of Waroona	31/03/1995	Pristine 90% Excellent 10% in 1995	0.7	Vegetation clearing Weed invasion Grazing by native or introduced species Too frequent fire	
Occurrence 4 WELR01	Wellard Nature Reserve 2547, Conservation Commission	31/03/1995, 03/10/2013, 30/10/2013, 28/11/2013	Pristine 95% Excellent 5% in 1995. Excellent 100% in 2013.	4.3	Vegetation clearing Weed invasion Too frequent fire	
Occurrence 5 BYRD01	Byrd Swamp Nature Reserve 2517, Conservation Commission	31/03/1995, 03/10/2013, 17/10/2013, 31/10/2013	Pristine 95% 5% Excellent in 1995. Excellent 100% in 2013.	46.3	Weed invasion Too frequent fire	

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Occurrence 6 MANEA01	Reserve 32963 Regional Park, City of Bunbury	03/05/1995, 25/09/2013, 07/10/2013,	Pristine 90% Very Good 10% in 1995. 100% Excellent in 2013.	3.2	Vegetation clearing Too frequent fire Recreational activities	
Occurrence 7 PIND02	Recreational Reserve 34033, Shire of Murray	02/10/2002, 04/02/2014	Good 30% Pristine 70% in 2002. Very Good 50% Excellent 50% in 2014.	0.7	Vegetation clearing Too frequent fire Weed invasion Rubbish dumping	
Occurrence 8 PIND04	Recreational Reserve 34033, Shire of Murray	02/10/2002	Pristine 95% and Excellent 5% in 2002	0.9	Vegetation clearing Too frequent fire Weed invasion	
Occurrence 10 PINJ03	Recreational Reserve 34033/41184, Shire of Murray	2007 (Ekologia), 04/02/2014	Very Good 100% in 2007. Very Good 50% Excellent 50% in 2014.	7.5206	Weed invasion Vegetation clearing Too frequent fire	
Occurrence 13 TOBY01	CRM 30148, Shire of Busselton (Management…)	06/09/2011, 18/10/2011	Very Good and Excellent in 2011	1.3	Weed invasion	
Occurrence 15 MYMRNP01	CR41830 Moore River Nature Reserve, Shire of Gingin	14/10/2004	Pristine (notes also say Excellent 100%	136.4	Hydrological changes - water quality and/ or quantity Weed invasion Too frequent fire	
Occurrence 18 LOU01	Reserve 32719, Bunbury	01/06/2016	Excellent	0.2	None recorded	

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Occurrence 19 COOLUPBUSHLAND02	Reserve 6542	17/05/2018	Very Good or Excellent	0.5	None recorded	

*For the purposes of relating condition to IUCN Criteria, condition categories from (Keighery (1994) Vegetation Condition Scale in Bush Forever (Government of WA 2000)) are defined below:

Good ('Pristine', 'Excellent', 'Very Good' using Bush Forever (2000) scale): This includes vegetation ranging from 'Pristine' - with no obvious signs of disturbance, to 'Excellent' - Vegetation structure intact, with disturbance only affecting individual species, weeds are non-aggressive species and 'Very Good' - Vegetation structure altered, obvious signs of disturbance eg: from repeated fires, dieback, logging, grazing.

Medium ('Good' using Bush Forever (2000) scale): This includes vegetation categorised as 'Good' - Vegetation structure altered but retains basic vegetation structure or ability to regenerate it, obvious signs of disturbance are present, from activities including partial clearing, dieback and grazing.

Poor ('Degraded', 'Completely degraded' using Bush Forever (2000) scale): This includes vegetation ranging from 'Degraded' Basic vegetation structure severely impacted by disturbance, the vegetation requires intensive management, and disturbance such as partial clearing, dieback, logging and grazing, to 'Completely Degraded' where vegetation structure is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native shrubs and trees.

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APPENDIX 1 THREATS

From DPaW (2015)

Too frequent fires

Inappropriate fire regimes are a significant threat to the clay pan communities. Historically, fire within the clay pans was probably only very occasional. It is likely that some of the clay pan types such as the Shrublands on dry clay flats may be adapted to occasional fire as they contain species that will easily carry fire when vegetation is dry, and some component shrubs would reproduce from seed following fire. The fire response of the major types of clay pan vegetation needs to be determined however.

The risk of fire is generally increased by the presence of urban areas nearby. In addition, grassy weeds in the understorey are often more flammable than many of the original native species in the herb layer.

Weed invasion

Weeds displace native plants, particularly following disturbances such as too frequent fire, grazing or partial clearing, and compete with them for light, nutrients and water. They can also prevent recruitment, cause changes to soil nutrients, and affect abundance of native fauna. They can also impact on other conservation values by harbouring pests and diseases, and increasing the fire risk.

Introduced South African bulbous plants are a particularly serious group of weeds in clay pans. As the taxa occur in similar habitat in South Africa, many have the ability to invade relatively undisturbed clay pan habitat and displace the rich herbaceous flora. *Watsonia meriana*, *Sparaxis bulbifera* (harlequin flower), *Moraea flaccida* (one leafed cape tulip), *Hesperantha falcata* and *Freesia alba* x *lechtlinii* (freesia) are of particular concern. Seed and cormels are spread into undisturbed areas in sheet waterflow across wetlands (Brown and Brooks 2003b; Brown *et al*. 2008). South African perennial grasses are another serious group of weeds that also occur in similar habitat in South Africa and have the ability to invade clay pans in good condition following disturbance events such as fire. *Tribolium uniolae* (haas grass), *Eragrostis curvula* (lovegrass) and *Hyparrhenia hirta* (tambookie grass) are of particular concern and are a priority for control. The impacts of annual weeds are less well known but many move into intact vegetation following a disturbance event and appear to displace the native annual flora. These include *Cyperus hystrix*, *Parentucellia viscosa* (bartsia) and *Hypochaeris glabra* (flat weed).

Sources of weed invasion include adjoining areas of urban and agricultural use, drains, and tracks within and near the clay pans. All these sources increase vulnerability to weed invasion following any type of disturbance. The clay pans appear reasonably resistant to weed invasions due to seasonal inundation and hardness of soils in the summer and changes to these elements may alter their ability to resist weed invasion (Keighery 1996).

Gibson *et al*. (2005) noted that about 16% of the flora for the clay pans were weeds and some were particularly aggressive. Webb (2019) compared data for proportion of native and weed species in occurrences of the community in 1994, and at a timepoint between 2010 and 2018. Linear projections of a 50-year forecast based on these trends are shown in Figure 1 below. Linear projections have been calculation based on these two timepoints. The projection indicates that if weeds are unmanaged in these occurrences, the proportion of native species will decline to approximately 53% of the total number of species in the community within the next 50 years (ie 47% weeds).

- Native species will decrease from 80.67% currently to 53.2% in another 50 years
- Natives species decreased from 93.3% in 1994, and are projected to decrease to 53.2% 50 years from now
- Weeds species are projected to increase from 19.33% currently to 46.76% in another 50 years
- Weeds have increased from 6.7% in 1994 and are projected to increase to 46.7% 50 years from now.

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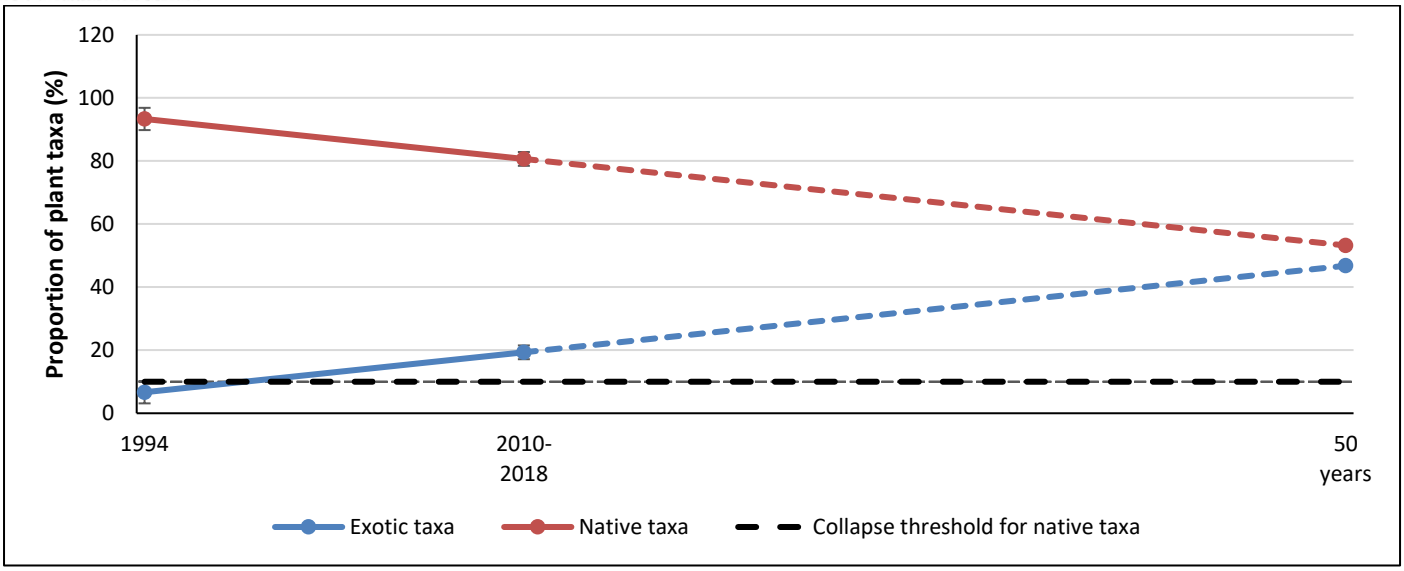

Figure 1. Trend in the proportion of native and exotic plant species in 'Dense shrublands on clay flats (floristic community type 9 as originally described in Gibson et al. (1994))' based on the mean of 3 sampled quadrats, located in the South-west region (n = 3). Quadrats were initially scored in 1994, and re-scored between 2010 and 2018. An additional 50-year forecast was calculated using a linear trendline of the proportion of exotic taxa (y = 6.6667 + 0.52778x) and the proportion of native taxa (y = 93.8611 - 0.52778x) (data from Webb 2019).

Hydrological changes - water quality and/ or quantity

Altered hydrology due to anthropogenic causes, in urbanised areas in particular, is likely to be an increasing threat to the clay pans. Drainage to lower watertables, clearing resulting in a decline in evapotranspiration and increased surface runoff, and water quality declines are likely to increasingly impact the hydrologic regimes of the clay pan communities. Altered periods of ponding may affect the timing of growth of herbs in the understorey, and may also affect the species composition of the community by favouring different taxa. Any changes to the natural hydrology of the clay pans can affect composition as they are dependent on the timing of filling and drying at appropriate times of the year.

Increased nutrient levels in surface water in occurrences adjacent to areas such as farm lands and residential areas is likely to favour weeds as they are adapted to higher nutrient levels than native flora.

In addition, there is data for one bore that is immediately adjacent to occurrence PINJ03, of the SCP09 community. that occur close to or within the clay pan communities, and the bore data for these have been extracted from Department of Water and Environmental Regulation (2020) Water Information (WIN) database. The figure below provides data about changes in groundwater depth over time beneath examples of the clay pan communities.

Figure 2 indicates the seasonal nature of the superficial watertable, and the lack of connection of groundwater to surface in each case. Groundwater levels are relatively stable, with a slight decline, over the ten-year period (2009-2020) at this one occurrence. There is a 5-year gap of monitoring data between 2012 and 2017.

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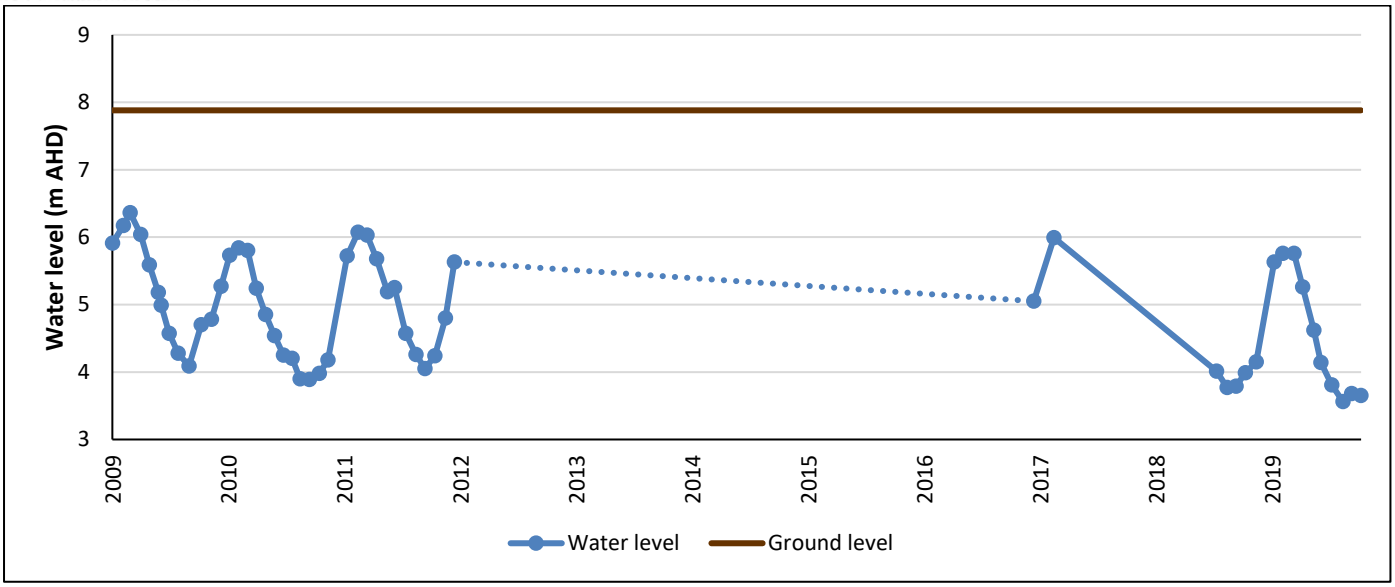

Figure 2. Hydrograph of bore located within Crown Reserve 41184, 9m west of occurrence PINJ03 (site ref: 61410660) (DWER 2020) (Water levels were not monitored from 2012 to 2017).

Vegetation clearing

The seasonal clay-based wetland communities of the south west are amongst the most threatened assemblages in Western Australia. It is estimated that >90% of the original extent of these wetlands has been cleared for agricultural use (Gibson *et al*. 2005). Clay pans in the Perth area have also historically been cleared and quarried for clay for use in manufacturing bricks and tiles.

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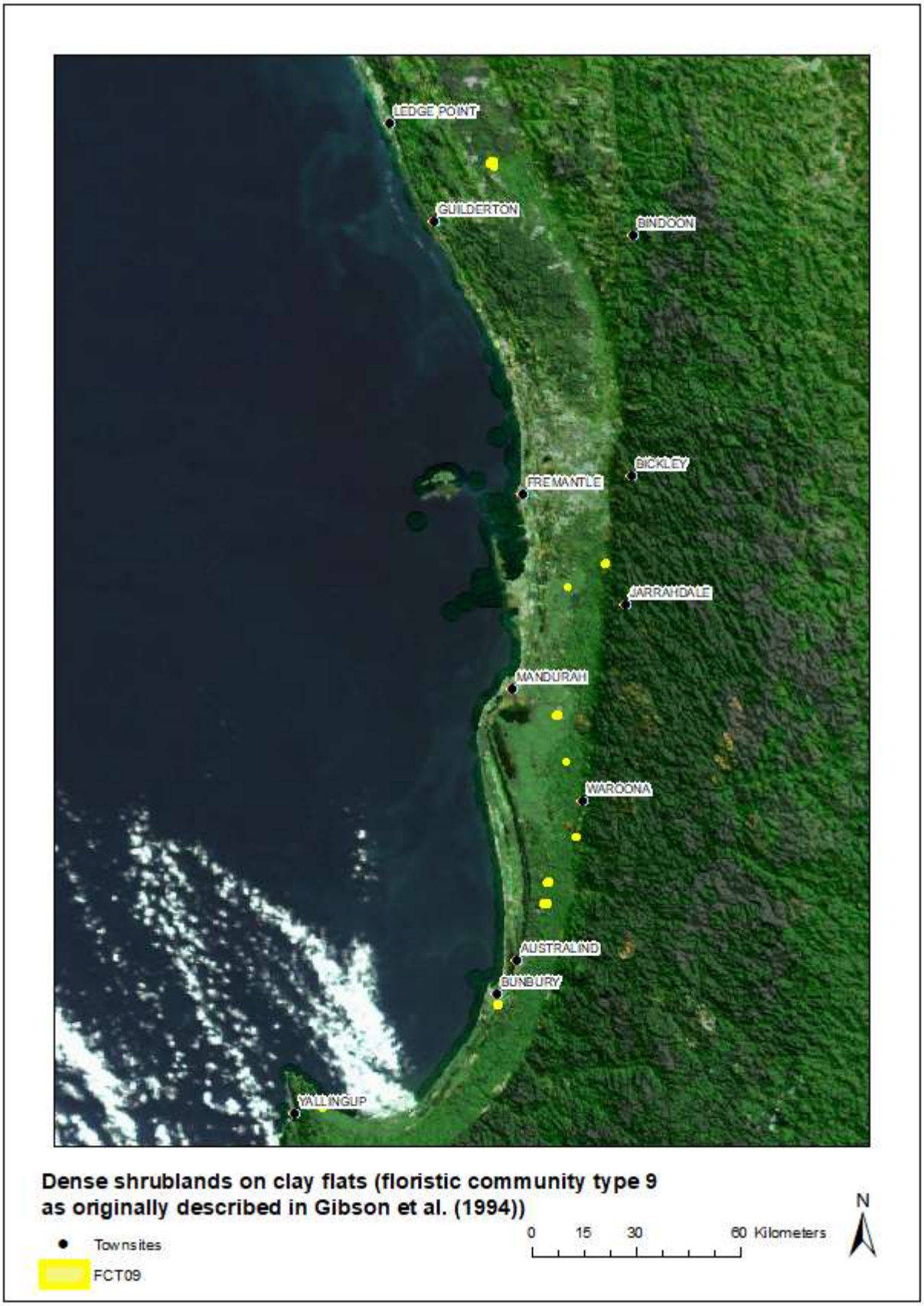
APPENDIX 2: Distribution of the Dense Shrublands on Clay Flats (floristic community type 9) TEC



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APPENDIX 3 IUCN Red List Criteria for ecosystems (version 2.2) (IUCN 2017)

A. Reduction in geographic distribution over ANY of the following time periods:

		CR	EN	VU
A1	Present (over the past 50 years).	≥ 80%	≥ 50%	≥ 30%
A2a	Future (over the next 50 years).	≥ 80%	≥ 50%	≥ 30%
A2b	Future (over any 50 year period including the present and future).	≥ 80%	≥ 50%	≥ 30%
A3	Historic (since 1750).	≥ 90%	≥ 70%	≥ 50%

B. Restricted geographic distribution indicated by EITHER B1, B2 or B3:

		CR	EN	VU
B1	Extent of a minimum convex polygon enclosing all occurrences (Extent of Occurrence)	≤ 2,000 km²	≤ 20,000 km²	≤ 50,000 km²
	AND at least one of the following (a-c):			
	(a) An observed or inferred continuing decline in **EITHER**:			
	i. a measure of spatial extent appropriate to the ecosystem; **OR**			
	ii. a measure of environmental quality appropriate to characteristic biota of the ecosystem; **OR**			
	iii. a measure of disruption to biotic interactions appropriate to the characteristic biota of the ecosystem.			
	(b) Observed or inferred threatening processes that are likely to cause continuing declines in geographic distribution, environmental quality or biotic interactions within the next 20 years.			
	(c) Ecosystem exists at …	1 location	≤ 5 locations	≤ 10 locations
B2	The number of 10 × 10 km grid cells occupied (Area of Occupancy)	≤ 2	≤ 20	≤ 50
	AND at least one of a-c above (same sub-criteria as for B1).			
B3	A very small number of locations (generally fewer than 5) **AND** prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and thus capable of collapse or becoming Critically Endangered within a very short time period (B3 can only lead to a listing as VU).			VU

C. Environmental degradation over ANY of the following time periods:

			Relative severity (%)		
		Extent (%)	≥ 80	≥ 50	≥ 30
C1	The past 50 years based on change in an abiotic variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table:	≥ 80	CR	EN	VU
		≥ 50	EN	VU	
		≥ 30	VU		
			≥ 80	≥ 50	≥ 30
C2	The next 50 years, or any 50-year period including the present and future, based on change in an abiotic variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table:	≥ 80	CR	EN	VU
		≥ 50	EN	VU	
		≥ 30	VU		
			≥ 90	≥ 70	≥ 50
C3	Since 1750 based on change in an abiotic variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table:	≥ 90	CR	EN	VU
		≥ 70	EN	VU	
		≥ 50	VU		

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D. Disruption of biotic processes or interactions over ANY of the following time periods:

			Relative severity (%)		
		Extent (%)	≥ 80	≥ 50	≥ 30
D1	The past 50 years based on change in a biotic variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table:	≥ 80	CR	EN	VU
		≥ 50	EN	VU	
		≥ 30	VU		
			≥ 80	≥ 50	≥ 30
D2	(D2a) The next 50 years, or (D2b) any 50-year period including the present and future, based on change in a biotic variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table: OR	≥ 80	CR	EN	VU
		≥ 50	EN	VU	
		≥ 30	VU		
			≥ 90	≥ 70	≥ 50
D3	Since 1750, based on a change in a biotic variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table:	≥ 90	CR	EN	VU
		≥ 70	EN	VU	
		≥ 50	VU		

E. Quantitative analysis

	CR	EN	VU
… that estimates the probability of ecosystem collapse to be:	≥ 50% within 50 years	≥ 20% within 50 years	≥ 10% within 100 years