Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

Nomination *(to be completed by nominator)*

Current conservation status				
Name of ecological community:	**Shrublands and woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20c as originally described in in Gibson *et al*. (1994))**			
Other names:	Floristic community type 20c (FCT20c); Swan Coastal Plain type 20c (SCP20c)			
Description:	The community occurs mainly on the transitional soils of the Ridge Hill Shelf, on the Swan Coastal Plain adjacent to the Darling Scarp, but also extends marginally onto the alluvial clays deposited on the eastern fringe of the Swan Coastal Plain. It has been recorded between Stratton and Maddington. It generally comprises a shrubland or woodland of *Banksia attenuata* (slender banksia) and *Banksia menziesii* (firewood banksia), sometimes with *Allocasuarina fraseriana* (western sheoak), over a shrub layer that can include the species *Adenanthos cygnorum* (woolybush), *Hibbertia huegelii*, *Scaevola repens* var. *repens* (fan flower), *Allocasuarina humilis* (dwarf sheoak), *Bossiaea eriocarpa* (common brown pea), *Hibbertia hypericoides* (yellow buttercups) and *Stirlingia latifolia* (blueboy). A suite of herbs including *Conostylis aurea* (golden conostylis), *Trachymene pilosa* (native parsnip), *Lomandra hermaphrodita, Burchardia congesta* (milkmaids) and *Patersonia occidentalis* (purple flag), and the sedges *Mesomelaena pseudostygia* (semaphore sedge) and *Lyginia barbata* usually occur in the community. The community is also known as "floristic community type 20c" as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994) "A floristic survey of the southern Swan Coastal Plain" (unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)).			
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	16/07/2000	Endangered	
Western Australia	TEC list: WA Minister ESA list in policy	06/09/2001	Critically endangered	B) ii)
	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 ☐

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'.*	CR B1a(i),(iii),b; B2a(i),(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**
	Justification of assessment under Criterion A.	For criteria A and B, the ecosystem is assumed to collapse when the mapped distribution declines to zero. • Community SCP20c occurs on the Forrestfield, Guildford and Southern River vegetation complexes. These complexes have been extensively cleared for agriculture, mining, forestry and urban development. The remaining proportion of the pre-European extent of these complexes are 5%, 12% and 18% respectively (Government of Western Australia 2019). • The reduction in extent of native vegetation on the land units is assumed to be indicative of the level of clearing of the community. The extent of decline of these vegetation complexes since 1750, ranges from 72% to 95%. • The timing of the vegetation clearing is not known so is conservatively inferred to be since 1750. • Gibson *et al*. (1994) estimated a ≥90% reduction of SCP20c since 1750 based on their analysis of the level of clearing of vegetation on the geomorphologies and landforms that support the community and this approximates the estimates of decline derived from vegetation complex data. • Based on available evidence, the community plausibly meets criterion A3 as the distribution decline ranges from 72%-95%, which is within the ≥70% threshold of decline since 1750 required to meet EN under A3. • **EN under criterion A3 is plausible**

B.	Restricted geographic distribution *(EOO and AOO, number of locations and evidence of decline)*	☒ **B1** (specify at least one of the following): CR ☒ **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 39km^2 (≤2,000km^2). The community's EEO is less than the 2,000km^2 threshold for rank CR. Community meets threshold for rank CR under criterion part B1. • B2: AOO is two 10x10 km grid cells (threshold for EN is 20, and for CR is two grid cells). Community meets threshold for rank CR under criterion part B2. • B1a, B2a): A decline in a measure of spatial extent is inferred. A 72%-95% reduction in extent of native vegetation on the land units is assumed to be indicative of the level of clearing of the community. It is inferred two occurrences (total area approx. 5 ha) are to be cleared in the immediate future based on current planning information. **Meets CR under criterion B1a(i); B2a(i)** • *Conospermum incurvum* at Talbot Road reserve (the stronghold of the community) is the last remaining population in the Perth Metro Area. This and other Proteaceae species in the community are susceptible to dieback disease. Dieback survey data at this occurrence support an inference of continued decline in a measure of disruption to environmental quality to support ranking under B1a(iii) and B2a(iii), with inference of continuing decline in environmental quality over next 20 years. **Meets CR under criterion B1a(iii); B2a(iii)** • B1b, B2b): There is observed or inferred continuing decline from vegetation clearing, dieback disease, weed invasion, and future decline in environmental quality from hydrological changes, that are likely to cause continuing decline in the next 20 years (see Appendix 1 for further information on threats). **Meets CR under B1b and B2b.** • c): Community is considered to occur at six threat defined locations, based on the identification of three clusters of occurrences of the community that are likely to be subject to similar threats (including exposure to too frequent fires and weed invasion) (threshold for CR is one, for EN is five, and for VU is 10 threat-defined locations). **Meets VU under B1c, B2c.** • B3): Known from six threat-defined locations based on the identification of six clusters of occurrences of the community. Does not meet VU as ≥5 threat defined locations. • **Meets criteria for critically endangered under B1a(i),(iii),b; B2a(i),(iii),b. Meets VU under B1c, B2c.**
C.	Environmental degradation of abiotic variable *(Evidence of decline over 50-year period)*	☐ **C1** ☐ **C2** ☐ **C3**

	Justification of assessment under Criterion C.	• Hydrological change from declining groundwater levels due to groundwater abstraction is an abiotic variable that may be a threat to the community. • For criterion C, the assessment of decline is based on hydrological change based on the effects of groundwater drawdown on canopy trees. • It is assumed conservatively that the community would collapse if the groundwater fell to about 10m below ground surface. This is based on the maximum water depth accessed by deep rooted phreatophytic taxa (Froend and Loomes 2006), and observations that the vigour of canopies declined in groundwater dependent trees in association with declining water table levels (Froend *et al.* 2004). • There are inadequate data to link groundwater decline to compositional changes, including loss of trees. • Inadequate data available to assess if the community meets the minimum threshold for proportion of the extent (≥30%) or proportional severity of degradation (≥30%) over any 50-year period, or ≥50% of the extent and proportional severity of degradation ≥50% since 1750 to meet VU. • **Available evidence does not indicate 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.	• Dieback disease caused by *Phytophthora* species is a significant biotic threat to the community. • For criterion D, collapse of this community is defined as 100% loss of dieback sensitive species in the community. It is assumed that this would result from very severe infestation and impacts of disease caused by *Phytophthora* species. • Based on a dieback survey completed for Talbot Road reserve in 2011, which equates to 54% of all occurrences of the community, a minimum of approximately 45 ha (34%) of the community is infected with the disease. • It is assumed that the impacts of the disease have occurred since 1750, as there are no data to indicate the timing of the impact in this community. A minimum severity of ≥30%, with an extent of ≥80% would be required to be affected by the disease to meet the minimum thresholds for VU under D3. • Although dieback mapping encompass one occurrence of the community, there are inadequate systematic collected quantitative data about the impacts of dieback on individual sensitive species and insufficient evidence to determine the total loss of susceptible native species lost through dieback infection in this community to support assessment of the community against criterion D. • There are inadequate quantitative data to indicate the community meets the minimum proportion of the extent (≥30%) or proportional severity of disruption of abiotic processes (≥30%) over any 50-year period to meet criteria D1 or D2.

		• D3: There are inadequate quantitative data to indicate if the community meets the minimum proportion of the extent (≥50%) or proportional severity of disruption of abiotic processes (≥50%) since European settlement (1750). • **Insufficient evidence to indicate if 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 ranked critically endangered using original ranking criteria developed in WA that differ from 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	39.4km^2	AOO	Two 10x10 km grid cells
No. occurrences	12	Severely fragmented	Yes ☒ No ☐ Unknown ☐
Justification	The community was likely naturally fragmented and associated with specific habitats at the eastern edge of the Swan Coastal Plain. Land clearing has increased the fragmentation of the community with all occurrences existing in an urban environment, separated by roads, buildings and infrastructure.		
Current known area			130.6 ha
Pre-industrialisation extent or its former known extent (if known)			Based on range of loss of 72-95%, original area estimated at 466-2612ha (130.6x100/28; 130.6x100/5).
Estimated percentage decline			Estimated 72-95% decline

Summary assessment against IUCN RLE Criteria

Criterion	Rank indicated	Overall conclusion
A1	-	• Insufficient evidence to indicate if community meets criterion
A2a	-	• Insufficient evidence to indicate if community meets criterion
A2b	-	• Insufficient evidence to indicate if community meets criterion
A3	EN	• Estimated loss of 72-95% since ~1750. • Meets criterion for EN
B1a	CR	• EOO is <2,000km^2 • Data to indicate ongoing decline in (i) measure of spatial extent and (iii) biotic interactions • Meets criterion for CR
B1b	CR	• EOO is ≤2,000km^2 • Observed and inferred threats likely to cause continuing decline within the next 20 years • Meets criterion for CR
B1c	VU	• EOO is ≤2,000km^2 • Ecosystem exists at six threat-defined locations • Meets criterion for VU
B2a	CR	• Data to indicate ongoing decline in (i) measure of spatial extent and (iii) biotic interactions • Meets criterion for CR
B2b	CR	• AOO is two grid cells • Observed and inferred threats are likely to cause continuing decline within the next 20 years • Meets criterion for CR
B2c	VU	• AOO is two grid cells • Ecosystem exists at six threat-defined locations • Meets criterion for VU
B3	-	• Known from six threat-defined locations • Does not meet criterion
C1	-	• Inadequate evidence to indicate if the community meets the minimum thresholds to meet VU.
C2	-	• Inadequate evidence to indicate if the community meets the minimum thresholds to meet VU.
C3	-	• Inadequate evidence to indicate if the community meets the minimum thresholds to meet VU.
D1	-	• Inadequate evidence to indicate if the community meets the minimum thresholds to meet VU.
D2	-	• Inadequate evidence to indicate if the community meets the minimum thresholds to meet VU.
D3	-	• Inadequate evidence to indicate if the community meets the minimum thresholds to meet VU.
E	NA	• No quantitative estimates of the risk of ecosystem collapse.
		Meets criteria for endangered under A3. Meets critically endangered under B1a(i),(iii),b, B2a(i),(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 CR under B1a(i),(iii),b; B2a(i),(iii),b**

Department of Biodiversity, Conservation and Attractions

Summary of location (occurrence) information *(provide detailed information in the relevant sections of the nomination form)*						
Occurrence	Land tenure	Survey information : date of survey	Condition*	Area of occurrence (ha)	Threats *(note if past, present or future)*	Specific management actions
Bushmead	Freehold	2011	20% good 80% degraded	50.2	Clearing, grazing, recreational activities, weeds, frequent fire (*past, present, future*) Hydrological change, reduced groundwater levels and rainfall (*future - applies to all occurrences*)	
Talbot Road north	DBCA Crown reserve	2017	10% good 90% excellent	4.27	Clearing, weed invasion, recreational activities, rubbish dumping, frequent fire (*past, present, future*)	
Clifford	Freehold	2007	100% very good	0.84	Clearing, weed invasion, rubbish dumping, frequent fire (*past, present, future*)	
Stirling Crescent	Freehold, road reserve	2015	10% very good 90% excellent	6.63	Clearing, weed invasion, grazing (*past, present, future*)	
Farrell03	Freehold	2016	100% good	0.05	Clearing, weed invasion, frequent fire (*past, present, future*)	
Farrell04	Freehold	2016	100% good	0.15	Clearing, weed invasion, frequent fire (*past, present, future*)	
Farrell05	Freehold	2016	100% good	0.028	Clearing, weed invasion, frequent fire (*past, present, future*)	
Farrell06	Freehold	2016	100% good	0.48	Clearing, weed invasion, frequent fire (*past, present, future*)	
Talbot Road south	Nature reserve, Metropolitan Cemeteries Board reserve, unallocated Crown land	2014	10% good 90% excellent	66.84	Frequent fire, weeds, disease (*past, present, future*)	Weeds mapped, controlled and monitored; restoration plan developed, dieback markers installed, rehabilitation, track closure, information sheets distributed
MaidaVale03	Department of Planning, Lands and Heritage Crown reserve		Not surveyed	0.61	Clearing (*future*)	

MaidaVale06	Freehold		Not surveyed	0.28	Clearing (*future*)	
MaidaVale10	Freehold		Not surveyed	0.19	Clearing (*future*)	

*Condition to IUCN Criteria, condition categories from (Keighery 1994 Vegetation Condition Scales from 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 and native plant species diversity fully retained or almost so, zero or almost so weed cover/abundance, to 'Excellent' - Vegetation structure intact, with disturbance only affecting individual species, weeds are non-aggressive species, and the area contains high native plant species diversity, with less than 10% weed cover, and 'Very Good' - Vegetation structure altered, obvious signs of disturbance eg: from repeated fires, dieback, logging, grazing, aggressive weeds are present, with moderate native plant species diversity, and typical weed cover is less than 20% (5 – 20%).

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, logging, grazing, and very aggressive weeds are present, with low native plant diversity (5 – 50%).

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 are present, very aggressive weeds are present at high density, and very low native plant species diversity is observed (20 – 70%) to 'Completely Degraded' where vegetation structure is no longer intact and the area is completely or almost completely without native flora, referred to also as 'Parkland Cleared', with very low to no native species diversity (weed species greater than 70%).

APPENDIX 1 THREATS

Vegetation clearing

Clearing for agriculture and urbanisation has been extensive on the Ridge Hill Shelf, Pinjarra plain (Guildford) and Southern River vegetation complexes, on the eastern side of the Swan Coastal Plain where the community occurs. The community is also likely to have been regionally rare prior to any clearing (Gibson *et al*. 1994). These vegetation complexes have been extensively cleared for agriculture, mining, forestry and urban development. The remaining proportion of the pre-European extent of the complexes that support the community is between 5 and 28% (Government of Western Australia 2019).

The south-eastern portion of Reserve 23953 at Talbot Rd (occurrence 11) was historically cleared and used for gravel extraction. Bushland adjacent to Reserve 23953 at Talbot Road was planned for development but was recently acquired and is now managed by DBCA. The Metropolitan Cemeteries Board manage a portion of the land in Talbot Road reserve and have sought to clear additional areas of vegetation that contains SCP20c in the recent past. There are two areas of unallocated Crown land within the Talbot Road Bushland. The Bushmead Rifle Range is currently now managed by a private developer, with the portion that contains SCP20c under covenant with DBCA. Planned upgrades to Roe Highway at Clifford Road and Stirling Crescent Bushland involve further clearing of approximately 5 ha of the community. Clearing within or near additional areas of the community on private land is also planned.

Too frequent fire

Fires are likely to have a significant effect on the vegetation composition in Mediterranean ecosystems such as those in the south-west of Western Australia (Abbott and Burrows 2003). If an appropriate frequency of fires is exceeded however, species that are obligate seeders may not have sufficient time to flower and produce seed. If the time between fires is too long, obligate seeders may become senescent and be unable to regenerate. Therefore, fires must occur at appropriate intervals and possibly the appropriate season and intensity to sustain the integrity of plant communities. As this community is not well studied, little is known of its requirements in terms of fire regime to maintain species composition. However, it is likely that the fire regimes in Talbot Road and Bushmead have been modified to more frequent fires, especially hot burns, since European settlement. The recent high frequency of fires in the Talbot Road Bushland is likely to have favoured weeds and plants that propagate by resprouting.

Disturbance in remnants typically results in increasing weed invasion, particularly where remnants are small and surrounded by weed sources. The risk of fire is increased by the presence of grassy weeds in the understorey, as they are likely to be more flammable than the original native species in the herb layer. The last major fire in Talbot Road Bushland was in February 2001 and burnt nearly 45 hectares. An increased fire frequency is likely to impact the community in terms of structure, composition and level of weed invasion.

Fire within Bushmead Rifle Range would increase weed levels but also may induce germination of seed stored within the soil. The area does not appear to have been burnt for many years and historical grazing may have caused the loss of some species from the site that now only occur as propagules in the soil.

Weed invasion

Weed invasion is usually enhanced by disturbances including fires and grazing if weed propagules are present. The occurrences of this community are close to agricultural or urban areas that act as weed sources, and occurrences are vulnerable to weed invasion following any disturbance. Current levels of weeds in the southern portion of Talbot Road reserve are still quite low.

There are tracks through occurrences of the community. Weeds have invaded to varying extents along these tracks. In particular, piles of soil scraped from tracks generally contain high concentrations of weeds and act as a source of weed invasion.

A disused gravel pit occurs in the south-east portion of Talbot Road reserve. This area contains some significant infestations of weeds.

Grazing

The Bushmead occurrence has been grazed by sizeable flocks of sheep over the years and this appears to have altered the structure and composition of the plant community by reducing flora diversity, trampling, selective grazing and weed invasion.

Rabbits have impacted parts of Talbot Road Bushland in the past, particularly where fires have decreased the density of understorey vegetation. They selectively graze more palatable species and spread weeds in their droppings. A rabbit control program has been undertaken using fumigation and ripping of the burrows in the area of the community

managed by the Metropolitan Cemeteries Board (Reserve 6955). Goats have impacted the vegetation through grazing at Stirling Crescent for several years.

Disease introduction

Dieback causes loss of susceptible species and alters composition and structure of vegetation. The community appears to be quite susceptible to dieback caused by *Phytophthora* species and the pathogen is common in Talbot Road Bushland (Safstrom and Taman 1999). In 2011, a full *Phytophthora* dieback interpretation was completed for Talbot Road Nature Reserve (Figure 1) (DEC 2012). Approximately 45% of occurrence Talbot Road south is infected with dieback. The drainage waters flowing through Talbot Road may also be carrying the pathogen.

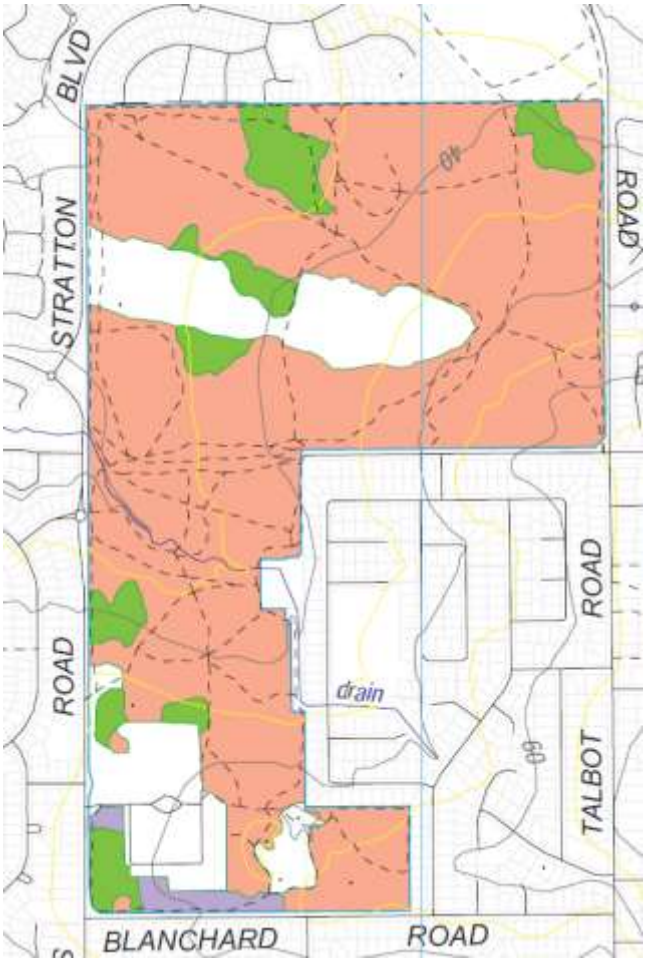

Figure 1. Dieback infection coverage of the Talbot Road Nature Reserve (includes the occurrence Talbot Road south). Pink represents those areas infested, green represents those areas where there was no infestation, purple represents uninterpretable, and no colour represents areas not able to be mapped at the time (DEC 2012).

The occurrence of the community in Bushmead may also have been impacted by dieback introduced historically and/or spread by vehicles, sheep or walkers.

The presence of dieback was assessed and found on the western side of the Roe Highway in Stirling Crescent Bushland and a negative result for dieback presence was obtained for the eastern side of Roe Highway in the Stirling Crescent area.

A considerable proportion of the ability of the disease to cause significant impacts is related to levels of rainfall, as indicated by the occurrence maps for the disease that show far greater impacts in higher rainfall zones. The main causes of disease spread that may occur in future are therefore likely to be associated with human activity, as south west WA has experienced declining rainfall in the last 50 years, and is likely to experience lower rainfall in future. The level of threat from this source may therefore potentially decline.

The total area of mapped Banksia woodlands across their range that coincide with inferred disease areas and those in which the disease has been detected was 19,984ha as at 2008 (2010 GIS data Forest Management Branch DEC). This represents about 6% of the remaining extent of the Banksia woodlands of the Swan Coastal Plain. This may represent an underestimate of the area of the Banksia woodlands that is dieback infected as much of the extent of the Banksia Woodlands may not have been surveyed for the disease.

Recreation activities

Recreational activities can result in trampling, spread/amplification of dieback, and general disturbance. Increased density of surrounding housing increases likelihood of impacts by recreational users, such as walkers and 4WD vehicles. Talbot Road occurrences are subject to high levels of recreational use.

Hydrological changes

Most of the area of this community is structurally a Banksia woodland or Eucalypt woodland. The dominant Banksia and Eucalypt species of the ecological community tend to be deep-rooted and are dependant primarily on groundwater for survival. They are therefore susceptible to impacts from groundwater drawdown, and declining rainfall which limits the potential recharge to the water table (Department of Agriculture, Water and the Environment - DAWE 2016). In the Perth North and Perth South subregions where this community occurs, almost all surface water and shallow, middle and deep groundwater areas that are on the Swan Coastal Plain show declining trends in groundwater levels (DAWE 2016).

The unconfined drain through the Talbot Road Bushland is resulting in noticeable levels of erosion and redeposition of topsoil. This drain flows through the southern end of this community. Water from urban areas to the east of Talbot Road Bushland is channelled into the reserve. This may be implicated in introducing and/or amplifying dieback in the reserve and well as bringing in nutrients and pollutants.

Drying and warming climate (taken from Department of Primary Industries and Regional Development 2020)

By 2030, mean rainfall is predicted to decline by 5-6% compared to current conditions. By 2090, the mean rainfall is predicted to decline by 12-18% compared to current conditions. Rainfall will decline by 29% in winter, and 36% in spring by 2090 in a high-emission scenario.

By 2090, mean annual temperature is projected to increase by 1.1–2.1°C in an intermediate-emission scenario and 2.6–4.2°C in a high-emission scenario. Average maximum and minimum temperatures are projected to increase by similar amounts. The intensity of hot spells is projected to increase over most of WA. The frequency will generally increase in the southern half of the state.

The number of days with severe fire danger rating and the cumulative forest fire danger index are likely to increase over most of WA in response to increased temperatures and decreased rainfall.

Based on the predicted changes the composition of the community may move towards species that are more heat, drought, and fire tolerant as a consequence of combined effects of reduced rainfall, declining groundwater and increasing temperatures and fire frequency and severity.

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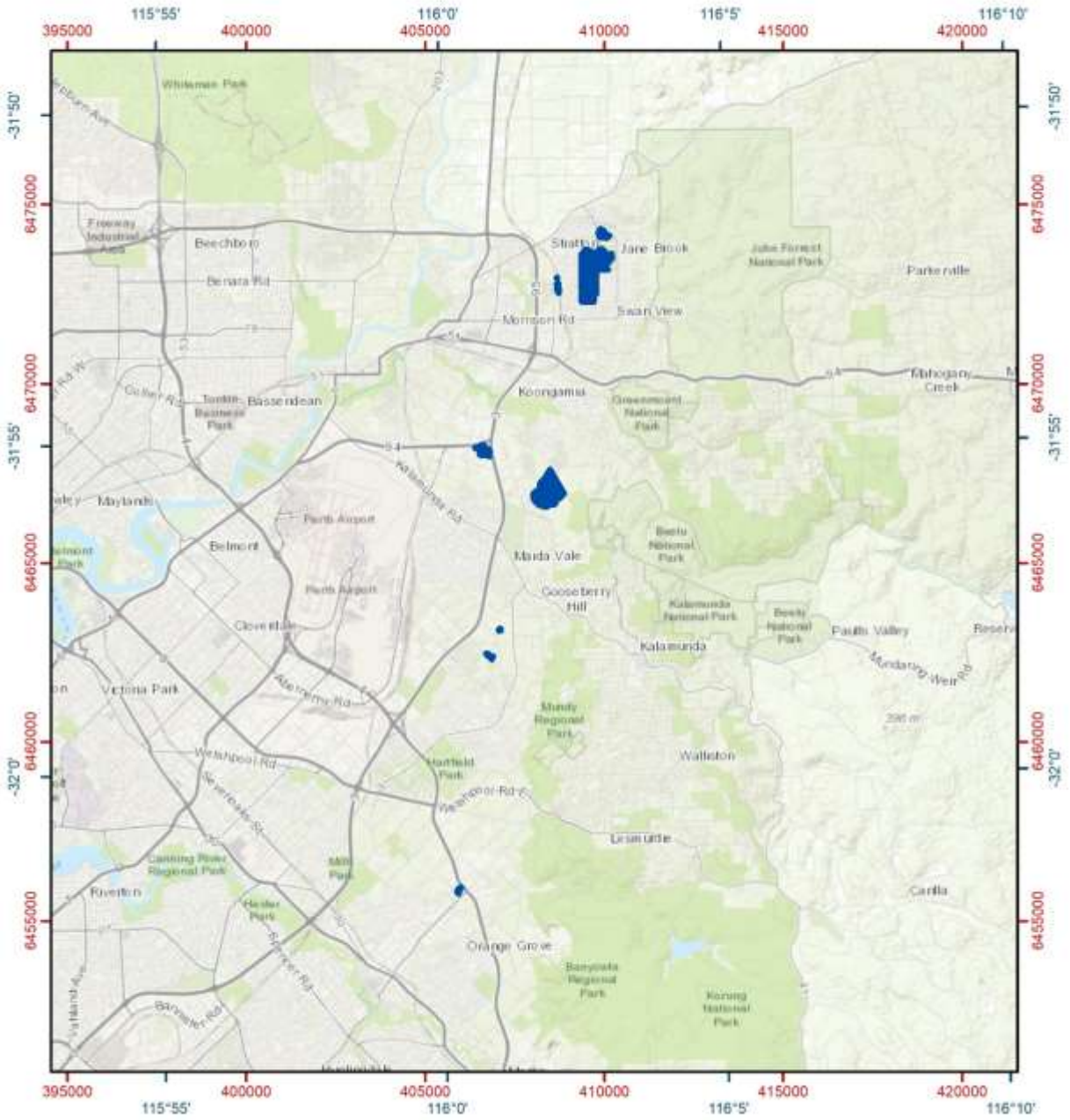
APPENDIX 2: Shrublands and woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20c as originally described in in Gibson *et al*. (1994) (pink)



The Dept. of Biodiversity, Conservation and Attractions does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence which may arise from relying on any information depicted.

Roads and tracks on land managed by DBCA may contain unmarked hazards and their surface condition is variable. Exercise caution and drive to conditions on all roads.

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 km^2	≤ 20,000 km^2	≤ 50,000 km^2
	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		

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		
D2			≥ 80	≥ 50	≥ 30

	(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