Department of Biodiversity, Conservation and Attractions

GOVERNMENT OF WESTERN AUSTRALIA

Nomination *(to be completed by nominator)*

Current conservation status				
Name of ecological community:	Assemblages of Roe River rainforest swamp			
Other names:				
Description:	The occurrence of the community is located within the Roe River area of the Prince Regent National Park in the northern Kimberley (see Appendix 2 for map). The rainforest canopy is 16 m high. Tree species include *Aglaia elaeagnoidea* (priyangu), *Alphitonia excelsa* (red ash) (priority 2), *Alstonia actinophylla* (white cheesewood), *Antidesma ghaesembilla* (yangu), *Bombax ceiba* (kapok tree), *Carallia brachiata*, *Cryptocarya cunninghamii, Ficus hispida*, *Lophostemon grandiflorus*, *Melaleuca viridiflora* (broadleaf paperbark), *Melastoma affine*, *Memecylon pauciflorum*, *Nauclea orientalis* (Leichardt pine), *Monoon australe*, *Sersalisia sericea* (Nangi), *Syzygium angophoroides*, *Syzygium forte* subsp. *potamophilum*, *Timonius timon*, *Trema tomentosa* and *Vitex acuminata*. The camaenid land snail assemblages in rainforest communities of the Kimberley Region can be used to distinguish patches from similar rainforest communities elsewhere in northern Australia. The community was originally described in "Kimberley rainforests of Australia" by McKenzie *et al*. (1991).			
Nomination for:	Listing ☐	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			
Western Australia	Threatened list	19/9/2000	Vulnerable	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 ☐

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'.*		VU B3
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. • A: There is no information to support an inference that a ≥30% reduction at least in geographic distribution has or will occur over any 50-year period, or a ≥50% reduction since 1750 (ie. the minimum requirements to meet the category VU under criterion A). • **Does not meet criterion A**
B.	Restricted geographic distribution *(EOO and AOO, number of locations and evidence of decline)*	☐ **B1** (specify at least one of the following): VU ☐ **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 0.3km^2(≤2,000km^2, which is the threshold for CR). • B2: AOO is one 10x10 km grid cell (threshold for EN is 20, and for CR is two grid cells). • a): Inadequate data are available to measure decline in spatial extent, environmental quality or disruption to biotic interactions to support ranking under B1 or B2a). • b): Historically, decline was observed from the impacts of cattle. Control programs undertaken in the national park have reduced the threat level. In 2016 during a helicopter flyover limited impact from cattle was observed. Current observed threats are damage by feral pigs and damaging late season fires (see Appendix 1 for further information on threats). Threats are 'trivial' as no available evidence indicates significant current or projected decline. • c): Ecosystem exists at one location however current level of threat considered 'trivial' (threshold for CR is one, for EN is five and VU is 10 threat-defined locations). • B3: Known from one threat-defined locations and prone to relatively low-level impacts of frequent fire and impacts of

		introduced herbivores. Although the current level of threat is considered trivial, community is considered prone to effects of human activities or stochastic events within a very short time period in an uncertain future and thus at risk of collapse in the medium term future, or becoming CR within a very short time period (meets VU as <5 threat defined locations). • **Meets Vulnerable B3.**
C.	Environmental degradation of abiotic variable *(Evidence of decline over 50-year period)*	☐ **C1** ☐ **C2** ☐ **C3**
	Justification of assessment under Criterion C.	• C1, C2: Inappropriate fire regimes are a significant abiotic variable that threatens the community. Collapse in this context is loss of all overstorey components (trees) as a consequence of an inappropriate fire regime (refers is too frequent late season severe fires). 100% of the extent of the community was in good condition when last surveyed and this is assumed to indicate that significant impacts from fire such as major death of trees was not evident (see definitions of condition categories under descriptions of locations - Table 2). No available data support an inference that the community meets the minimum thresholds for proportion of the extent (≥30%) or proportional severity of degradation (≥30%) over any 50-year period to meet VU. • C3: Based on assumption that vegetation condition reflects a lack of indicators of significant impact of abiotic threats to the community, the community does not meet the minimum thresholds for proportion of the extent (≥50%) or proportional severity of disruption of abiotic processes (≥50%) since 1750 to meet VU. • **Does not meet 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.	D1, D2: A significant biotic variable affecting the community is physical impacts of grazing and trampling by invasive herbivores (pigs and cattle). Collapse under criterion D is defined as a decline in vegetation condition to totally degraded (Bush Forever scales; ie. beyond recovery) as a consequence of grazing and trampling by introduced herbivores. It is estimated that 100% of the community was in Good Condition (refer Tables 2, 3 below) when last surveyed and this is interpreted to indicate that the impacts of introduced herbivores were relatively minimal in extent and severity. The community is therefore considered to have been subject to minimal disruption of biotic processes that would indicate a significant and measurable level of severity in relation to collapse. Based on these assumptions the community does not meet the minimum thresholds to meet vulnerable under criterion D: ie. 30% of the extent of the

		community affected to at least 30% severity over any 50-year period. • D3: Based on similar assumptions to those for D1, D2, the community does not meet the minimum proportion of the extent (≥50%) or proportional severity of disruption of biotic processes (≥50%) since 1750 to meet VU. • **Does not meet 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	0.3 km^2	AOO	One 10x10km grid cell (actual measured AOO is 100km^2).
No. occurrences	1	Severely fragmented (justification below)	Yes ☐ No ☒ Unknown ☐
Justification	Single occurrence known		
Current known area			26 ha
Pre-industrialisation extent or its former known extent (if known)			~26ha
Estimated percentage decline			Considered to occupy its former extent

Table 1. Summary assessment against IUCN RLE Criteria

Criterion	Rank indicated	Overall conclusion
A1	-	• Does not meet criterion
A2a	-	• Does not meet criterion
A2b	-	• Does not meet criterion
A3	-	• Does not meet criterion
B1a	-	• EOO is ≤2,000km^2 • No available data indicate decline in spatial extent, environmental quality or disruption to biotic interactions that would meet lowest thresholds of the criterion (VU) • Does not meet criterion
B1b	-	• EOO is ≤2,000km^2 • Threats currently considered 'trivial' • Does not meet CR B1b, as overall threats are considered 'trivial'
B1c	-	• EOO is ≤2,000km^2 • Ecosystem exists at one location • EOO indicative of rank CR however does not meet B1c, as overall level of threat is considered 'trivial'
B2a	-	• AOO is one grid cell • No data available that indicate decline in spatial extent, environmental quality and disruption to biotic interactions that meets minimum thresholds of the criterion (VU) • Does not meet criterion
B2b	-	• AOO is one grid cell • Threat currently considered 'trivial' • AOO indicative of rank CR however does not meet B2b, as overall level of threat is considered 'trivial'
B2c	-	• AOO is one grid cell • Ecosystem exists at one location • Does not meet B2c as level of threat considered 'trivial'
B3	VU	• Known from one location • Prone to the effects resulting from introduced herbivores and late season fire • Meets criterion for VU
C1	-	• Does not meet the minimum thresholds for proportion of the extent (≥30%) or proportional severity of degradation (≥30%) over past 50 years to meet VU.
C2	-	• Does not meet the minimum thresholds for proportion of the extent (≥30%) or proportional severity of degradation (≥30%) over any 50-year period to meet VU.
C3	-	• Does not meet the minimum thresholds for proportion of the extent (≥50%) or proportional severity of disruption of abiotic processes (≥50%) since 1750 to meet VU.
D1	-	• Does not meet the 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	-	• Does not meet the minimum thresholds for proportion of the extent (≥30%) or proportional severity of disruption of biotic processes (≥30%) over past 50 years to meet VU.
D3	-	• Does not meet the 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.
		Meets VU under B3

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Table 2: 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
RoeR(16/2)	Prince Regent National Park (27164)	1987-1989 2016 (low level flyover)	100% good 100% good	26	Cattle and pig grazing and trampling, spread of introduced species, inappropriate fire regimes *(past, present and future)*	Install fencing, control weeds, control introduced fauna, protect from late season fire in particular

*For the purposes of relating condition to IUCN Criteria, condition categories from (Keighery (1994) Vegetation Condition Scale (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' using Bush Forever (2000) scale): Basic vegetation structure severely impacted by disturbance such as partial clearing, dieback, logging and grazing. Scope for regeneration but not to a state approaching good condition without intensive management.

Beyond recovery ('Completely degraded' using Bush Forever (2000) scale): 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.

Table 3. Condition of Assemblages of Roe River rainforest swamp

Condition Ranking (Keighery 1994) from Government of Western Australia 2000)	**Hectares**	**IUCN Criteria condition ranking**	**Hectares**
Pristine		**Good**	
Excellent			
Very Good			
Good	26	**Medium**	26
Degraded		**Poor**	
Completely degraded		**Beyond recovery**	
Total	26	**Total**	26

APPENDIX 1 THREATS

Introduced herbivores

Feral pigs and free ranging cattle access the Roe River rainforest swamp community causing physical damage to the vegetation and wetland through trampling; as well as grazing the vegetation, altering the species composition by selectively removing edible species, and opening of the vegetation canopy which may lead to grass and/or weed invasion and increase susceptibility to fire damage. In addition to physical disturbances, faeces of cattle contaminate the soil and water, particularly in open water, causing nutrient enrichment. This may enhance the introduction of weeds as well as elevate nutrient levels in the surface or groundwater. The impact of pigs and cattle disturbance to the community are being managed through culls. A helicopter flyover was undertaken in 2016 and the canopy appeared in good condition, with little damage by cattle observed (pers. comm. [redacted][1]).

Weed invasion

Weeds displace native plants and compete with them for light, nutrients and water. Weeds 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. *Passiflora foetida* var. *hispida* was recorded in the community in the 1987 to 1989 rainforest survey (McKenzie *et al*. 1991) and requires careful monitoring and control as it is highly invasive and likely to become a major threat to the community unless managed.

Altered fire regimes (late season fire)

Rainforests are particularly vulnerable to and degraded by intense fires late in the dry season. An increase in the fire frequency within the community may alter the structure and composition, remove vegetation, increase the spread of weeds and ultimate 'drying' of the community. Without appropriate management, the impacts of fire are likely to increase as the region is predicted to become even more fire prone with a drying climate (CSIRO and BOM 2015).

References

CSIRO and Bureau of Meteorology (2015) Climate Change in Australia Information for Australia's Natural Resource Management Regions: Technical Report, CSIRO and Bureau of Meteorology, Australia.

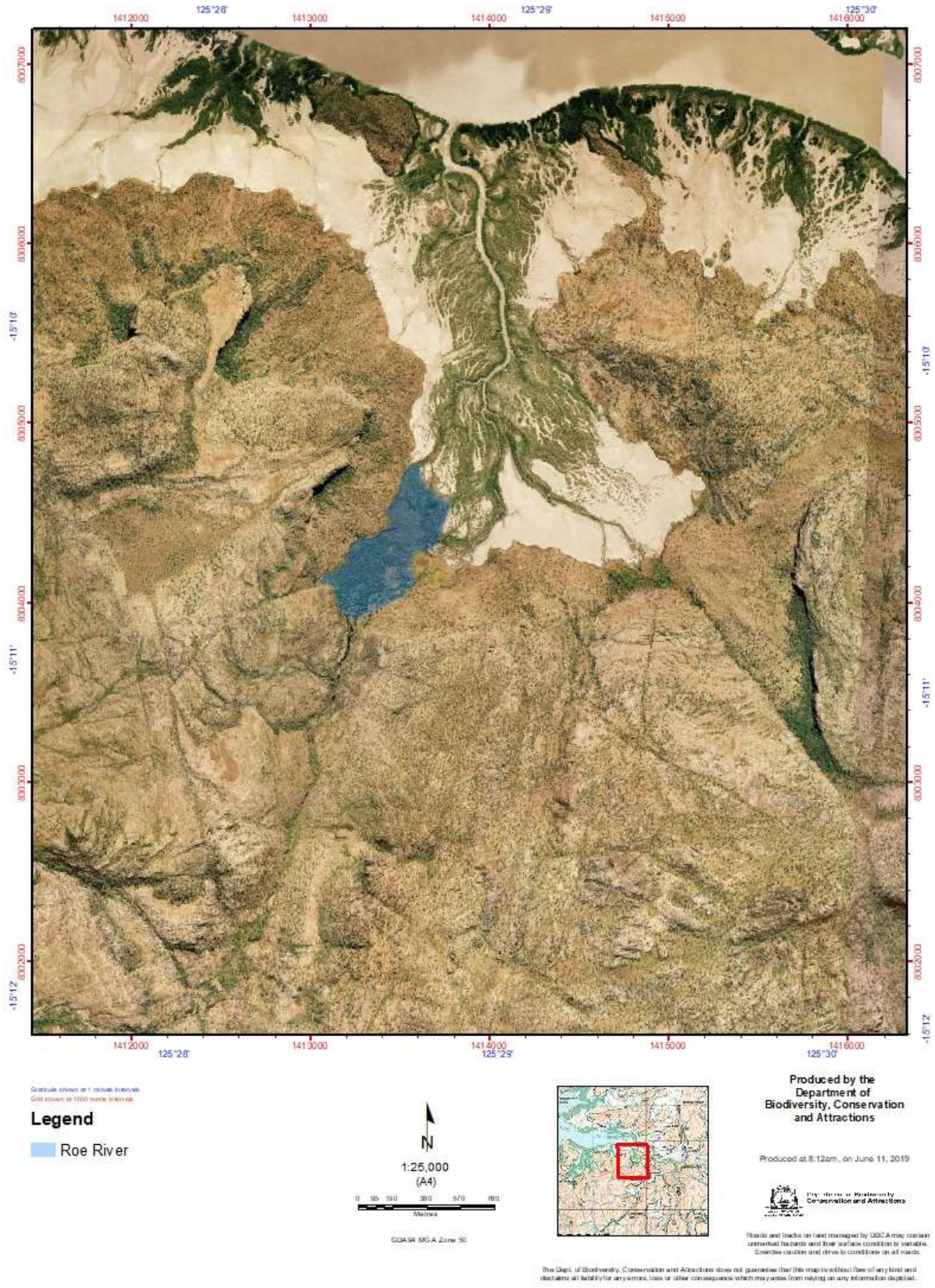
Government of Western Australia (2000) Bush Forever. Department of Environmental Protection, Perth.

Keighery, B.J. (1994) Bushland Plant Survey. A Guide to Plant Community Survey for the Community. Wildflower Society of Western Australia (Inc.), Nedlands, Western Australia.

McKenzie, N.L., Belbin, L., Keighery, G.J. and Kenneally, K.F. (1991) Kimberley rainforest communities: Patterns of species composition and Holocene biogeography. In: Kimberley Rainforests of Australia. McKenzie, N.L., Johnston, R.B. and Kendrick, P.G. (eds). Surrey Beatty and Sons, Norton, NSW.

[1] Previously, Research Scientist Botanic Gardens and Parks Authority

APPENDIX 2 Roe River rainforest swamp community (blue)



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:

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:

Extent (%)	Relative severity (%) ≥ 80	≥ 50	≥ 30
≥ 80	CR	EN	VU
≥ 50	EN	VU	
≥ 30	VU		

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	≥ 50	≥ 30
≥ 80	CR	EN	VU
≥ 50	EN	VU	
≥ 30	VU		

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	≥ 70	≥ 50
≥ 90	CR	EN	VU
≥ 70	EN	VU	
≥ 50	VU		

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

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:

Extent (%)	Relative severity (%) ≥ 80	≥ 50	≥ 30
≥ 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