Risk Assessment as applied in identifying nature conservation management priorities for Cape Range (and proposed additions) Management Plan

This system is used to assist in identifying key values and management priorities. It involves scoring values/attributes and threats against a series of criteria in order to rank them. Scoring for each criterion is dependent on the expertise, knowledge and experience of the people involved in the assessment process. This will be robust if a sufficiently large group with a broad range of expertise and knowledge of the area is used. This approach with all its inherent imperfections provides, at the very least, a transparent expression of the logic and a record of the outcomes of the prioritisation process.

Values/Attributes

In this instance, the focus of this risk assessment tool is on the ecological values of the planning area, however, criteria which consider their 'social' attributes of these ecological values are included. As the maintenance of healthy ecosystems generally underpins human use and not vice versa, the ecological values are, intrinsically, of greater importance than 'social' values and this natural hierarchy is reflected in the greater number of ecological criteria relative to social ones.

Scoring for each criterion is based on a relative assessment of each value/attribute (i.e. down columns).
High score =3;
Medium score = 2;
Low score = 1.

The values/attributes criteria are:
Trophic status: low trophic level biotic attributes (i.e. primary producers) will score high against this criterion. Higher trophic level (e.g. consumers) biota will score low against this criterion. Where the value being considered is abiotic, it should automatically be given a high score as these underpin ecological processes.

Areal extent/biomass: attributes of the planning area that are widespread/abundant in their distribution, such as karst or spinfex, will score high against this criterion. Those with relatively localised distribution will score low.

Vulnerability: attributes that are highly susceptible to degradation by natural events and/or human pressures will score high against this criterion and vice versa.

Recovery potential: recovery potential can be measured in terms of resilience (measured as the maximum stress from which a value can recover) and stability (measured as the rate of recovery from a stress). Attributes with a low recovery potential will score high for this criterion and vice versa.

The following 4 criteria relate to the uniqueness of attributes over various spatial scales.
Locally significant
Regionally significant
Nationally significant
Globally significant

The criteria for ranking 'social' value are:
Cultural: attributes with existing or potential importance to the local, regional, national or international communities because of their heritage, historical, traditional, aesthetic and educational qualities will score high against this criterion.

Consequence: this criterion acknowledges that different threats have different social and political consequences. A high socio-economic/political consequence will score high and vice versa for this criterion.

Probability: this criterion addresses the probability of a threat occurring within the timeframe of the management plan. Existing pressures or a high probability of a threat occurring will score high and a low probability of a threat occurring will score low.

Table 2. Example of a Pressure Ranking Matrix

Pressure - value	Biological Intensity	Spatial Scale	Temporal Scale	Social Political Consequen	Probability	Total
Karst	3	2	2	2	3	12
Endemic and Localised Flora Species	1	3	2	1	2	9
Mangroves	3	3	3	1	2	12

Scoring: 3=High, 2 =Medium , 1=Low.

		Ecological significance				Biodiversity significance				Social significance						Threats/Threatening processes							
		Trophic status	Areal extent/ biomass	Vulnerability	Recovery potential	Locally significant	Regionally significant	Nationally significant	Globally significant	Cultural significance	Economic significance	Scientific signicance	Recreational significance	Total			Biological intensity	Spatial scale	Temporal scale	Social/political consequence	Probability	Total	Management actions and effectiveness
Geomorphology	**Values/Assets**																						
	Ancient paleo-drainage of Fortescue River	3*		3	1	2	3	3	1	1	3	1	3	1	25	Mining/extractive industries (gravel)	3	1	2	2	3	11	
																Infrastructure development (tourism, roading etc)	3	1	3	3	1	11	
	Karst	3*		3	2	3	3	3	3	3	3	3	3	2	34	Mining/extractive industries (gravel)	3	2	2	2	3	12	
																Infrastructure development (tourism etc)	3	1	3	3	3	13	
																Caving (to specific karstic features)	3	1	1	1	2	8	
																Hard-hooved animals (eg. goats, cattle)	3	3	2	1	1	10	
	Fossil deposits	1		1	3	3	3	3	2	3	1	3	1	27		Fossil collecting	3	2	2	1	2	10	
																Mining/extractive industries (gravel)	3	2	2	2	2	11	
																Infrastructure development (tourism, roading etc)	3	2	3	3	1	12	
																Roading	3	1	3	1	1	9	
	Cape Range terraces	3		3	2	3	3	3	2	3	1	3	2	31		Mining/extractive industries (gravel)	3	2	2	2	3	12	
																Infrastructure development (tourism, roading etc)	3	1	3	3	3	13	
	Orange dunes on range (north and south)	3		2	3	3	3	3	2	1	2	1	3	1	27	Sand mining/extractive industries	3	2	2	2	2	11	
																Unmanaged access	3	3	2	1	2	11	
																Infrastructure development	3	1	3	2	1	10	
																Hard-hooved animals (eg. goats, cattle)	3	1	1	1	1	7	
Hydrology																overgrazing	3	1	1	1	1	7	
Aspirational goal: Maintain hydrological processes in order to maintain biodiversity and geomorphological processes	**Anchialine system (underground estuary)**	3		3	2	3	3	3	3	3	2	3	3	1	32	Groundwater abstraction	3	2	2	2	2	11	
																Mining	3	2	3	2	1	11	
																Infrastructure development	3	1	2	3	3	12	
																Pollution	3	2	1	1	1	8	
																Climate change	3	3	3	1	2	12	
	Freshwater system (perched freshwater layer)	3		1	3	3	3	3	3	3	2	1	3	1	29	Groundwater abstraction	3	2	2	1	1	9	
																Mining	3	2	2	2	1	10	
	Interface between saline and freshwater	?		?	?	?	?	?	?	?	?	?	?	?		Climate change	3	3	3	1	2	12	
Biological																							
Aspirational Goal: No significant deleterious changes to biodiversity from 2004 levels or Maintain or enhance natural biodiversity within the planning area																							
	Flora																						
Disjunct (geographically isolated), relictual, endemic, or otherwise significant species (eg. orange dune reptile fauna?, coastal reptile community, beach nesting birds)	Endemic and localised species - *Livistonia alfredii* (disjunct), *Acanthocarpus rupestris*, *Brachychiton obusilobus, Grevillea calcicola, Leshenaultia* aff.*lutescens* and *Stackhousia umbellata*	1		1	3	3	3	3	2	1	2	1	3	1	24	Grazing by ferals/stock	1	3	2	1	2	9	
																Infrastructure development	1	2	3	3	1	10	
																Unmanaged access	1	2	2	1	1	7	
																Water abstraction	1	2	2	2	1	8	
																Environmental weeds	1	2	1	1	1	6	
																Inappropriate fires regimes	1	3	2	1	2	9	
																Recreation activities	1	2	1	3	1	8	
	Species with tropical affinities (restricted to the cooler, damper, and relatively fire-free western gorges of the range)	1		1	3	3	3	3	2	1	2	1	3	1	24	Inappropriate fire regimes	1	3	2	1	2	9	
																Grazing by ferals/stock	1	3	2	1	1	8	
																Climate change	1	3	3	1	2	10	
	Avifauna																						0
	northern-most limit of range - striated field wren, grey-breasted white-eye	1		1	2	2	3	3	2	1	2	2	3	1	23	Feral predators	1	3	2	1	2	9	
																Grazing by ferals/stock	1	3	2	1	1	8	
																Inappropriate fire regimes	1	3	3	1	2	10	
	southern-most western coastal limit - beach stone curlew, bar-shouldered dove, rufous-crowned emuwren, grey-headed honeyeater, painted firetail, spotted bowerbird	1		1	2	2	3	3	2	1	2	2	3	1	23	Feral predators	1	3	2	1	2	9	
																Grazing by ferals/stock	1	3	2	1	1	8	
																Inappropriate fire regimes	1	3	3	1	2	10	
	isolated populations, - spinifex pigeon, rufous-crowned emuwren, grey-headed honeyeater, painted firetail, little woodswallow, spotted bowerbird, grey shrike-thrush, spinifex pigeon (latter two distinctive morphologically)	1		1	3	3	3	3	2	1	2	1	3	1	24	Feral predators	1	3	2	1	2	9	
																overgrazing	1	3	2	1	1	8	
																Inappropriate fire regimes	1	3	3	1	2	10	
	Herpetofauna																						

northern geographic limit - seven species on western coastal dunes, largely restricted to the coastal corridor	1	1	2	2	3	3	2	1	2	2	3	1	23	Inappropriate fire regimes	1	3	2	1	2	9
														feral predators	1	3	2	1	2	9
														overgrazing	1	2	3	1	3	10
northern geographic limit (all restricted to the red sand ridges near Vlaming Head) - five species primarily of the central and northern coastal sandy deserts, two widespread Pilbara or sandy desert species, only one reptile species with mainly northern distribution	1	1	3	3	3	3	2	1	2	2	3	1	25	Inappropriate fire regimes	1	3	2	1	2	9
														overgrazing	1	3	3	1	1	9
														feral predators	1	3	2	1	2	9
isolated populations disjunct from conspecific populations in adjacent regions - five species	1	1	3	3	3	3	2	1	2	1	3	1	24	Inappropriate fire regimes	1	3	3	1	2	10
														feral predators		3	2	1	2	8
endemic, or nearly so, to the Cape Range peninsula - five species	1	1	3	3	3	3	3	1	2	1	3	1	25	Inappropriate fire regimes	1	3	3	1	2	10
														feral predators		3	2	1	2	8
threatened species	1	1	3	3	3	3	3	1	2	1	3	1	25	Human - wildlife interactions (with turtles, wallabies)	1	1	1	3	3	9
														Feral predators	1	3	2	1	2	9
														Oil pollution	1	2	1	3	1	8
Troglobytic fauna many relictual taxa of international conservation significance, including troglobitic fish (*Ophisternon candidum* and *Milyeringa veritas*), shrimps (*Stygiocaris* spp., ostracods (*Danielopolona* spp.), amphipods (*Liagoceradocus* spp., *Halosbaena* spp.), remipedes (*Lasionectes* spp.), plus many other families and orders of terrestrial and aquatic species.	1	1	3	3	3	3	3	3	3	1	3	1	28	Turbidity, run-off	3	3	2	1	2	11
														feral fish	3	1	2	1	1	8
														Oil pollution	3	1	1	1	1	7
														salt water intrusion	3	2	2	1	1	9
														Cave diving	3	1	1	1	2	8
														Inappropriate fires regimes	3	3	3	1	2	12
														Water abstraction	3	2	2	2	2	11
Molluscs endemic, with seven found only on the plateau and range itself - 10 species	1	1	3	3	3	3	3	3	2	1	3	1	27	Inappropriate fires regimes	1	3	3	1	2	10
														Climate change	1	3	3	1	2	10
southern limit of range - four species	1	1	2	2	3	3	2	1	2	2	3	1	23	Climate change	1	3	3	1	2	10
														Inappropriate fire regimes	1	3	3	1	2	10
Common species	3	3	1	1	2	2	1	1	2	2	1	2	21	Firewood collection	3	1	1	2	2	9
														Overgrazing by native animals	3	2	2	1	2	10
														Environmental weeds	3	2	1	1	2	9
														Infrastructure development	3	1	3	3	2	12
														Road traffic (roadkills)	3	1	1	2	3	10
														Inappropriate fires regimes	3	3	3	1	2	12
														Unmanaged access	3	2	2	1	2	10
														Oil pollution	3	1	1	1	1	7
Communities																				
Mangroves	3	1	2	2	3	3	3*	1	2	1	2	1	25	Climate change	3	3	3	1	2	12
Creekline vegetation	3	1	2	2	3	2	1	1	2	1	2	1	21	Firewood collection	3	1	1	2	2	9
intertidal habitats	2	1	2	2	2	1	1	1	1	1	1	2	17	Unmanaged access	2	2	2	1	2	9
														Shell collecting	2	1	1	1	3	8
supratidal habitats	2	1	2	2	2	1	1	1	2	1	1	2	18	Shell collecting	1	1	1	1	3	7
														Unmanaged access	2	1	2	1	2	8
Coastal colluvial flats – habitat, intrinsic	3	2	3	2	2	2	1	1	2	1	2*	2	22	Overgrazing by native animals	3	3	2	1	2	11
														Unmanaged access	3	1	2	1	2	9
														Environmental weeds	3	2	2	1	3	11
Vegetation of orange dunefields and red sandplains	3	2	3	2	3	3	2	1	2	1	2	1	25	Unmanaged access	3	2	2	1	2	10
														Environmental weeds	3	1	1	1	3	9
Samphire flats	3	2	2	2	2	2	1	1	2	1	1	2	21	Unmanaged access	3	1	2	1	2	9
Holocene dunes	3	3	2	2	1	1	1	1	1	1	1	3	20	Unmanaged access	3	1	2	1	2	9
Range slope habitats	3	3	2	2	3	3	1	1	2	1	1	1	23	Water abstraction	3	1?		2	2	9
														Environmental weeds	3	2	1	1	3	10
														Inappropriate fires regimes	3	3	3	1	2	12
Range crest habitats	?	?	?	?	?	?	?	?	?	?	?	?	?	?						0
Microhabitats – land snails	3	1	3	?	3	3	3	2	1	1	3	1	?	Inappropriate fires regimes	3	3	3	1	2	12
														Mining		2	2	2	2	8
Other rare or outlying vegetation types	?	?	?	?	?	?	?	?	?	?	?	?	?	Mining	?		2	2	2	8
														Inappropriate fires regimes		3	3	1	2	9
														Overgrazing by native animals		2	2	1	2	7
														Public perception that fox-baiting damaging to						
Seabird rookeries (e.g. Point Maud)	1	1	3	2	3	3	1	1	3	1	2	1	22	reptiles	1	1	1	3	2	8
														feral predators	1	2	2	2	3	10
														Human - wildlife interactions (with turtles, wallabies)	1	1	1	3	3	9
Threatened Ecological Communities – Bunderra Sinkhole, Cameron's Cave	3	1	3	3	3	3	3	3	3	1	3	1	30	feral fish	3	3	2	1	1	10
														Turbidity, run-off	3	3	1	1	2	10
														Water abstraction	3	3	2	2	1	11
Troglobitic communities	2	3	3	3	3	3	3	3	3	3	3	2	34	Turbidity, run-off	3	2	1	1	2	9
														feral fish	3	2	2	1	1	9
														Oil pollution	3	1	1	1	1	7