Family	Species	Site	Easting	Northing	Number of Individuals	Notes	Source
Malvaceae	Sida sp. Hamersley	BMF-oppMM	536578	7504346	1		Current survey
	Range (K. Newbey 10692)	ВМЕ-оррММ	536516	7504396	1	Record located immediately north of northern boundary of study area.	
		ВМ F -оррММ	536358	7504143	1		
		ВМ F -оррММ	536446	7503821	2		
		ВМ -оррММ	534313	7502242	1		
		ВМГ-оррММ	534331	7502259	1	Record located immediately north of northern boundary of study area.	
		ВМF-оррММ	534353	7502260	1	Record located immediately north of northern boundary of study area.	
		ВМ F- оррММ	534483	7502243	4		
		ВМ F- оррММ	534499	7502246	3		
		ВМF-оррММ	534507	7502239	5		
		ВМF-оррММ	534512	7502232	1		
		ВМF-оррММ	534519	7502228	3		
		ВМF-оррММ	534529	7502219	2		
		ВМF-оррММ	534552	7502224	1		
		BMF-OPSW	535827	7503732	3		
		BMF-OPSW	535837	7503753	12		
		BMF-RMJ	537828	7503955	5		
		BMF-RMX	538695	7504195	1		
		BMFRSPB	535887	7503784	6		
		BNV-JCF	533010	7502110	15		Brockman 4 Eastern Edge
		BNV-JCF	532818	7502145	5		Native Vegetation Clearing
		BNV-RB	533136	7502169	2		
		BNV-RB	533202	7502153	9		
		BNV-RB	533201	7502135	3		
		BNV-RB	533246	7502124	3		
		BNV-RB	533273	7502070	2		
		BNV-RB	533444	7501932	3		
		Opp.	536642	7501226	Not recorded		Botanical Survey of the
		Opp.	536703	7501090	Not recorded		Brockman Syncline Southern Marra Mamba Deposits J, M & N (Rio Tinto 2009)

Family	Species	Site	Easting	Northing	Number of Individuals	Notes	Source
Malvaceae	Sida sp. Hamersley Range (K. Newbey 10692)	Opp.	538836	7504319	Not recorded		Brockman 3 HPB Drilling AR-07-02408 Botanical Survey (Rio Tinto 2008a)
		Opp.	536023	7503370	10		Metadata Statement - Brockman Targeted Flora Survey (Rio Tinto 2015)
PRIORITY 2							
Malvaceae	Hibiscus sp. Gurinbiddy	BMF-OPCEF	535799	7502910	1		Current survey
	Range (M.E. Trudgen	BMF-OPCEF	535677	7502954	5		
	MET 13700)	BMF-OPCEF	535654	7502963	1		
		BMF-OPCEF	535620	7502975	1		
		BMF-OPCEF	538664	7504277	4		
		BMF-OPCEF	538741	7504325	2		
		BMF-OPCEF	538731	7504195	2		
		BMF-OPCEF	538775	7504190	1		
		BMF-OPCEF	538769	7504168	2		
		BMF-OPCEF	538772	7504105	1		
		BMF-OPCEF	538797	7504075	2		
		BMF-OPCEF	539194	7502572	10		
		BMF-OPCEF	539201	7502564	1		
		BMF-OPPL	537342	7504192	2		
		BMF-OPPL	537317	7504159	2		
		BMF-OPPL	537337	7504059	3		
		BMF-OPPL	537331	7503878	1		-
		BMF-OPPL	538484	7502399	21		
		BMF-OPPL	535940	7503711	8		
		BMF-oppMM	537957	7504124	1		
		BMF-oppMM	538325	7504007	2		
		BMF-oppMM	538660	7504253	2]
		BMF-oppMM	536435	7503848	1		4
		BMF-OPSW	538717	7502451	3		

Family	Species	Site	Easting	Northing	Number of Individuals	Notes	Source
Oxalidaceae	Oxalis sp. Pilbara	BMF-oppMM	538110	7504185	30		Current survey
	(M.E. Trudgen 12725)	BMF-oppMM	538124	7504193	20		
		BMF-oppMM	536358	7504143	3		
Asteraceae	Pentalepis trichodesmoides subsp. hispida	BMF-OPPL	539211	7502446	1		Current survey
PRIORITY 3							
Scrophulariaceae	Eremophila magnifica subsp. velutina	ВМГ-оррММ	536774	7504270	1		Current survey
Rubiaceae	Oldenlandia sp.	BMF-OPPL	528264	7496959	300		Current survey
	Hamersley Station	BMF-OPPL	528153	7497001	50		
	(A.A. MIICHEII PRP 1479)	BMF-OPPL	528051	7497033	250		
		BMF-oppMM	527246	7496943	50		
		ВМF-оррММ	527290	7496967	50		
		ВМF-оррММ	527316	7496982	6		
		ВМF-оррММ	527341	7496993	30		
		ВМF-оррММ	527331	7497050	50		
		ВМF-оррММ	527260	7497088	10		
		BMF-oppMM	527387	7498947	1		
		BMF-oppMM	539865	7502412	50		
		BMF-RMC	527191	7496914	6		
		BMF08	529061	7496875	100		
Amaranthaceae	Ptilotus subspinescens	BMF-OPPL	537084	7500918	100		Current survey
		BMF-OPPL	537239	7500984	8		
		ВМF-оррММ	534887	7500356	2		
		BMF-oppMM	534894	7500324	8		
		ВМF-оррММ	534893	7500309	2		
		BMF-oppMM	534889	7500300	20		

Family	Species	Site	Easting	Northing	Number of Individuals	Notes	Source
Amaranthaceae	Ptilotus subspinescens	ВМF-оррММ	534892	7500287	22		Current survey
		ВМF-оррММ	534905	7500283	8	Records located	
		ВМF-оррММ	534917	7500274	40	immediately south of	
		ВМF-оррММ	534942	7500270	30	southern boundary of study	
		ВМF-оррММ	534958	7500272	11	area.	
		ВМF-оррММ	534967	7500290	30		
		ВМF-оррММ	534957	7500305	25		
		ВМF-оррММ	534946	7500306	12		
		ВМF-оррММ	534934	7500307	4		
		ВМF-оррММ	535195	7500338	1		
		ВМF-оррММ	535200	7500334	10		
		ВМF-оррММ	535197	7500324	20		
		ВМF-оррММ	535208	7500313	20		
		ВМF-оррММ	535222	7500314	20		
		ВМF-оррММ	535222	7500314	20	Records located	
		ВМF-оррММ	535240	7500300	40	immediately south of	
		ВМF-оррММ	535242	7500283	20	southern boundary of study	
		ВМF-оррММ	535258	7500282	30	area.	
		ВМF-оррММ	535272	7500298	40		
		ВМF-оррММ	535281	7500313	15		
		ВМF-оррММ	535268	7500326	6		
		ВМF-оррММ	535252	7500324	7		
		ВМF-оррММ	535234	7500326	20		
		ВМF-оррММ	535220	7500334	30		
		ВМF-оррММ	535275	7500365	8		
		ВМF-оррММ	535287	7500353	10		
		ВМF-оррММ	535297	7500364	10		
		ВМF-оррММ	535286	7500372	8		
		BMF-oppMM	534808	7500356	8		
		BMF-oppMM	534802	7500365	8		
		BMF-oppMM	534783	7500354	2		
		BMF34	534851	7500339	20		

Family	Species	Site	Easting	Northing	Number of Individuals	Notes	Source
Amaranthaceae	Ptilotus subspinescens	Opp.	525119	7498975	70		Brockman Syncline Marra
		Opp.	529219	7499932	29		Mamba DP08/DP09
		Opp.	529933	7500024	50		Biological Assessment
		Opp.	529941	7499973	40		
		Opp.	529957	7499994	30		
		Opp.	529962	7499942	80		
		Opp.	529969	7500030	20		
		Opp.	529988	7499950	100		
		Opp.	530006	7499914	40		
		Opp.	530008	7499882	20		
		Opp.	530031	7499887	30		
		Opp.	531994	7500290	Not recorded		Botanical Survey for
		Opp.	529159	7498762	Not recorded		Brockman 4 Bypass to
		Opp.	529168	7498688	Not recorded		
		Opp.	529184	7498811	Not recorded		200007
		Opp.	523596	7500284	20		BS4 - Marra Mamba Sth -
		Opp.	523348	7500124	3		Resource Drilling AR-07-
		Opp.	523503	7500199	Not recorded		2007)
		Opp.	523534	7500228	50		2007
		Opp.	523264	7500084	20		
		Opp.	523108	7500081	100		
		Opp.	522823	7500044	50		
		Opp.	522706	7500067	30		
		Opp.	522663	7500014	100		
		Opp.	529244	7498916	10		BS4 Proposed ANFO
		Opp.	529274	7498911	25		Road (Pilbara Iron 2007)
		Opp.	521918	7500023	Not recorded		A Vegetation and Flora
	Opp.	521948	7500099	Not recorded		Survey of the Brockman	
	Opp.	522053	7500095	Not recorded		near Tom Price (Biota	
		Opp.	522093	7500072	Not recorded		2005)
		Opp.	522279	7500031	Not recorded		
		Opp.	522313	7499990	Not recorded		

Family	Species	Site	Easting	Northing	Number of Individuals	Notes	Source
Amaranthaceae	Ptilotus subspinescens	Opp.	522313	7500138	Not recorded		A Vegetation and Flora
		Opp.	522335	7500035	Not recorded		Survey of the Brockman
		Opp.	522359	7500200	Not recorded		syncline 4 Project Area,
		Opp.	522378	7500019	Not recorded		2005)
		Opp.	522398	7500178	Not recorded		,
		Opp.	522421	7499988	Not recorded		
		Opp.	522487	7500133	Not recorded		
		Opp.	522519	7500014	Not recorded		
		Opp.	522522	7500177	Not recorded		
		Opp.	522538	7500095	Not recorded		
		Opp.	522584	7500173	Not recorded		
		Opp.	522760	7500226	Not recorded		
		Opp.	522834	7500076	Not recorded		
		Opp.	522856	7500208	Not recorded		
		Opp.	522859	7500175	Not recorded		
		Opp.	522886	7500107	Not recorded		
		Opp.	523021	7500090	Not recorded		
		Opp.	523091	7500117	Not recorded		
		Opp.	523108	7500219	Not recorded		
		Opp.	523111	7500253	Not recorded		
		Opp.	523129	7500158	Not recorded		
		Opp.	523425	7500320	Not recorded		
		Opp.	523555	7500352	Not recorded		
		Opp.	523749	7500333	Not recorded		
		Opp.	523758	7500262	Not recorded		
		Opp.	522056	7500177	Not recorded		Brockman 4 2003 drilling
		Opp.	522086	7500253	Not recorded		(Hamersley Iron 2003)
		Opp.	522191	7500249	Not recorded		
		Opp.	522231	7500226	Not recorded		
		Opp.	522417	7500185	Not recorded		
		Opp.	522451	7500144	Not recorded		
		Opp.	522451	7500292	Not recorded		
		Opp.	522473	7500189	Not recorded		
		Opp.	522497	7500354	Not recorded		
		Opp.	522516	7500173	Not recorded		

Family	Species	Site	Easting	Northing	Number of Individuals	Notes	Source
Amaranthaceae	Ptilotus subspinescens	Opp.	522536	7500332	Not recorded		Brockman 4 2003 drilling
		Opp.	522559	7500142	Not recorded		(Hamersley Iron 2003)
		Opp.	522625	7500287	Not recorded		
		Opp.	522657	7500168	Not recorded		
		Opp.	522676	7500249	Not recorded		
		Opp.	522722	7500327	1		
		Opp.	522898	7500380	200		
		Opp.	522972	7500230	5		
		Opp.	522994	7500362	Not recorded		
		Opp.	522997	7500329	7		
		Opp.	523024	7500261	Not recorded		
		Opp.	523159	7500244	10		
		Opp.	523229	7500271	10		
		Opp.	523246	7500373	20		
		Opp.	523249	7500407	1		
		Opp.	523267	7500312	200		
		Opp.	523563	7500474	50		
		Opp.	523693	7500506	1		
		Opp.	523887	7500487	Not recorded		
		Opp.	523896	7500416	50		
		Opp.	530001	7500049	3		Brockman Syncline 4 Marra Mamba Vegetation and Flora Survey (Biota 2013a)
Poaceae	Triodia basitricha	ВМF-оррММ	538073	7503477	100		Current survey
		ВМF-оррММ	538069	7503515	100		
		ВМF-оррММ	538076	7503562	100		
		ВМF-оррММ	538446	7503799	100		
		ВМF-оррММ	538408	7503490	100		
		ВМF-оррММ	538393	7503438	200		
		ВМF-оррММ	538373	7503312	100		
		BMF-oppMM	536217	7502563	100		
		ВМF-оррММ	536182	7502601	500		
		BMF-oppMM	536123	7502740	20		
		ВМF-оррММ	536098	7502822	200		
		ВМF-оррММ	535637	7502353	200		

Family	Species	Site	Easting	Northing	Number of Individuals	Notes	Source
Poaceae	Triodia basitricha	ВМF-оррММ	535816	7502285	200		Current survey
		BMF-oppMM	535967	7502297	50		
		ВМF-оррММ	536110	7502249	100		
		ВМF-оррММ	538896	7503615	200		
		ВМF-оррММ	538909	7503858	200		-
		ВМF-оррММ	536678	7503626	200		-
		ВМF-оррММ	534140	7501621	200		_
		BMF-oppMM	534665	7501969	200		
		BNV-JCF	531412	7501497	Not recorded (8%		Brockman 4 Eastorn Edgo
		BNV-PA	533504	7501343	13 cover)		Brockman 4 Eastern Edge
		BNV-SW	532589	7501644			Clearing Permit Report
		BNV08	533533	7501565	Not recorded (2% cover)		(Biota 2014a)
		MMF07	532277	7501461	3		Brockman Syncline 4
		MMF-PL	532267	7501542	100		Marra Mamba Vegetation
		MMF-SV	531640	7501562	1		2013a)
		WQR-Opp	532297	7501345	Not recorded		Vegetation and Flora
		WQR-Opp	532026	7501376	Not recorded		Survey of the White Quartz
		WQR-Opp	531883	7501406	Not recorded		2007a)
PRIORITY 4							
Fabaceae	Acacia bromilowiana	BMF-OPPL	537062	7504279	40		Current survey
		BMF-OPPL	537342	7504224	13		
		ВМF-оррММ	535330	7503197	8		
		ВМF-оррММ	535327	7503183	10		
		ВМF-оррММ	535319	7503157	11		
		ВМF-оррММ	535316	7503144	11		
		BMF-OPSW	537424	7504174	3		
Goodeniaceae	Goodenia nuda	MMFR08	531780	7500506	10		Current survey

Records of Introduced Flora (Weed) Species from the Study Area



Family	Species	Site	Easting	Northing	Number of Individuals	Source
Asteraceae	*Bidens bipinnata	BMF-OPCEF	538776	7504193	1	Current Survey
		ВМF-оррММ	531872	7500983	2	
		ВМF-оррММ	538463	7504257	5	
		BMF-RMR	531926	7500943	2	
		BMF-RMS	524142	7499260	5	
		BMF-RMV	524434	7500787	1	
		BMF02	528824	7497841	50	
		BMF09	527192	7498556	2	
		BMF11	527561	7498869	20	
		BRO11	524801	7500670	1	A Vegetation and Flora Survey of the Brockman Syncline 4
		BRO27	521021	7500137	1	Project Area, near Tom Price (Biota 2005)
Asteraceae	*Flaveria trinervia	BMF-OPCEF	535281	7502751	2	Current Survey
		BMF-OPPL	520671	7499993	3	
		BMF-OPPL	529155	7497668	1	
		ВМF-оррММ	526703	7496837	3	
		BMF-oppMM	527209	7500067	1	
		BMF-oppMM	527295	7497329	1	
		ВМF-оррММ	527758	7497659	10	
		ВМF-оррММ	527835	7497659	3	
		ВМF-оррММ	527944	7497648	5	
		ВМF-оррММ	528372	7499453	5	
		ВМF-оррММ	528433	7499475	5	
		ВМF-оррММ	531897	7500056	1	
		BMF-oppMM	532636	7500361	20	
		ВМF-оррММ	534606	7500323	1	
		BMF-oppMM	534834	7500621	1	
		ВМF-оррММ	535357	7500498	1	
		ВМF-оррММ	539865	7502412	5	
		BMF-oppMM	540222	7502880	20	
		BMF-oppMM	540232	7502907	5	
		BMF-oppMM	540242	7502834	1	
		BMF-oppMM	540252	7502885	5	
		BMF-RMB	526774	7496922	2	
		BMF-RMD	527836	7497467	3	
		BMF-RMI	532421	7500142	1	
		BMF-RMP	535514	7500601	5	

 $^{^{1}\,}$ "Op" or "Opp" in the site name denotes an opportunistic record.

Family	Species	Site	Easting	Northing	Number of Individuals	Source
Asteraceae	*Flaveria trinervia	BMF-RMQ	532706	7500443	2	Current Survey
		BMF-RMZ	540250	7502909	20	
		BMF02	528824	7497841	50	
		BMF04	528213	7497786	1	
		BMF05	527739	7497637	25	
		BMF07	528586	7498521	1	
		BMF08	529061	7496875	1	
		BMF10	529081	7497454	1	
		BMF12	528728	7498928	1	
		BMF14	531972	7500369	4	
		BMF15	532746	7500242	5	
		BMF31	532275	7500647	1	
		BMF34	534851	7500339	3	
		BRO11	524801	7500670	1	
		BRO23	519277	7499213	1	A vegetation and Flord Survey of the Brockman Syncline 4 Project Area, page Tom Price (Riota 2005)
		BRO25	519517	7499865	1	Troject Alea, hear form lice (blord 2003)
Asteraceae	*Sigesbeckia orientalis	BMF-OPCEF	534128	7502241	20	Current Survey
		BMF-OPCEF	535071	7502930	15	
		BMF-OPCEF	535089	7502907	30	
		BMF-OPCEF	535115	7502862	30	
		BMF-OPCEF	535128	7502834	50	
		BMF-OPCEF	535144	7502831	200	
		BMF-OPCEF	535164	7502821	100	
		BMF-OPCEF	535187	7502801	30	
		BMF-OPCEF	535211	7502971	20	
		BMF-OPCEF	535243	7502760	20	
		BMF-OPCEF	535305	7502743	200	
		BMF-OPCEF	538095	7504144	2	
		BMF-OPCEF	538106	7504152	8	
		BMF-OPCEF	538127	7504148	8	
		BMF-OPCEF	538193	7504144	10	
		BMF-OPCEF	538196	7504106	10	
		BMF-OPCEF	538349	7503394	1	
		BMF-OPCEF	538502	7504249	50	
		BMF-OPCEF	538507	7504256	200	
		BMF-OPCEF	538544	7504222	5	
		BMF-OPCEF	538571	7504213	5	
		BMF-OPCEF	538690	7504323	200	

Family	Species	Site	Easting	Northing	Number of Individuals	Source
Asteraceae	*Sigesbeckia orientalis	BMF-OPCEF	538731	7504195	50	Current Survey
		BMF-OPCEF	538737	7504249	5	
		BMF-OPCEF	538741	7504325	100	
		BMF-OPCEF	538753	7504116	10	
		BMF-OPCEF	538784	7504200	20	
		BMF-oppMM	534275	7502242	3	
		ВМF-оррММ	534284	7502239	5	
		ВМF-оррММ	534346	7502262	100	
		ВМF-оррММ	534353	7502260	10	
		ВМF-оррММ	534364	7502244	20	
		ВМF-оррММ	534378	7502239	50	
		BMF-oppMM	534394	7502245	20	
		ВМF-оррММ	534401	7502242	20	
		ВМF-оррММ	534437	7502246	100	
		ВМF-оррММ	534467	7502238	20	
		BMF-oppMM	534478	7502240	50	
		ВМF-оррММ	534499	7502246	5	
		ВМF-оррММ	534519	7502228	10	
		BMF-oppMM	535241	7502980	10	
		ВМF-оррММ	535250	7502975	100	
		ВМF-оррММ	535255	7502968	200	
		ВМF-оррММ	535267	7502951	500	
		BMF-oppMM	535275	7502922	500	
		ВМF-оррММ	535275	7502941	500	
		BMF-oppMM	535312	7502910	300	
		ВМF-оррММ	535313	7502891	1	
		BMF-oppMM	537756	7504021	1	
		BMF-oppMM	537945	7504120	50	
		BMF-oppMM	538008	7504203	100	
		BMF-oppMM	538021	7504182	100	
		BMF-oppMM	538031	7504169	100	
		BMF-oppMM	538037	7504157	100	
		BMF-oppMM	538067	7504126	10	
		BMF-oppMM	538069	7504175	30	
		BMF-oppMM	538075	7504153	30	
		BMF-oppMM	538077	7504195	50	
		BMF-oppMM	538111	7504196	200	
		BMF-oppMM	538124	7504193	100	

Family	Species	Site	Easting	Northing	Number of Individuals	Source
Asteraceae	*Sigesbeckia orientalis	ВМF-оррММ	538202	7504166	20	Current Survey
		ВМF-оррММ	538250	7504061	100	
		ВМF-оррММ	538311	7504005	20	
		ВМF-оррММ	538374	7503921	100	
		ВМF-оррММ	538405	7504064	2	
		ВМF-оррММ	538406	7504209	50	
		ВМF-оррММ	538414	7504239	100	
		ВМF-оррММ	538455	7504260	100	
		ВМF-оррММ	538479	7504255	200	
		ВМF-оррММ	538502	7504256	200	
		ВМF-оррММ	538526	7504269	200	
		ВМF-оррММ	538720	7504179	50	
		BMF17	538051	7503840	1	
Asteraceae	*Sonchus oleraceus	BMF-OPCEF	538236	7504047	1	Current Survey
		BMF15	532746	7500242	3	
Fabaceae	*Vachellia farnesiana	ВМF-оррММ	540222	7502880	1	Current Survey
		BMF-RMB	526774	7496922	1	
		BMF-RMD	527836	7497467	8	
		BMF07	528586	7498521	1	
		BMF17	538051	7503840]	
		MMFR12	530186	7500076	1	
		OPP.	527003	7498340	Not recorded	Botanical Survey for Brockman 4 Bypass to Beasley River (Rio Tinto 2008b)
Malvaceae	*Malvastrum americanum	BMF-OPPL	520671	7499993	15	Current Survey
		ВМF-оррММ	526703	7496837	1	
		ВМF-оррММ	527299	7499583	1	
		ВМF-оррММ	527353	7499581	2	
		ВМF-оррММ	527382	7498960	100	
		ВМF-оррММ	527387	7498947	30	
		ВМF-оррММ	527392	7498983	20	
		ВМF-оррММ	531896	7500959	2	
		BMF-RMB	526774	7496922	1	
		BMF-RMD	527836	7497467	21	
		BMF-RMS	524142	7499260	1	
		BMF-RMZ	540250	7502909	2	
		BMF02	528824	7497841	1	
		BMF12	528728	7498928	250	
		BMF15	532746	7500242	7	

Family	Species	Site	Easting	Northing	Number of Individuals	Source
Malvaceae	*Malvastrum americanum	BRO23	519277	7499213	1	A Vegetation and Flora Survey of the Brockman Syncline 4
		BRO27	521021	7500137	1	Project Area, near Tom Price (Biota 2005)
		OPP.	526952	7498350	Not recorded	Botanical Survey for Brockman 4 Bypass to Beasley River (Rio
		OPP.	527003	7498340	Not recorded	Tinto 2008b)
		MMFOPP	526427	7499062	5	- Brockman Syncling & Marra Mamba Vogotation and Elora
		MMFOPP	527090	7499577	10	– Survey (Biota 2013a)
		MMFOPP	527686	7499636	3	
		OPP.	528777	7499062	Not recorded	BS4 Proposed ANFO Storage Area and Access Road (Pilbara Iron 2007)
Poaceae	*Cenchrus ciliaris	BMF-OPPL	520671	7499993	4	Current Survey
		BMF-OPPL	528636	7498763	3000	
		BMF-OPPL	528833	7497513	200	
		ВМF-оррММ	526703	7496837	50	
		ВМF-оррММ	527010	7498450	1	
		ВМF-оррММ	527299	7499583	5	
		ВМF-оррММ	527326	7499580	20	
		ВМF-оррММ	527353	7499581	5	
		ВМF-оррММ	527379	7498980	20	
		ВМF-оррММ	527382	7498960	15	
		ВМF-оррММ	527387	7499002	20	
		ВМF-оррММ	527392	7498983	100	
		BMF-oppMM	527452	7499539	20	
		ВМF-оррММ	527460	7497507	1	
		ВМF-оррММ	531845	7500043	10	
		ВМF-оррММ	531871	7500044	50	
		BMF-oppMM	531891	7500044	200	
		ВМF-оррММ	531896	7500959	200	
		ВМF-оррММ	531897	7500056	40	
		ВМF-оррММ	540222	7502880	1000	
		BMF-oppMM	540232	7502907	2000	
		ВМF-оррММ	540242	7502834	500	
		ВМF-оррММ	540249	7502851	500	
		BMF-oppMM	540252	7502885	10	
		BMF-RMA	526682	7496851	5	
		BMF-RMB	526774	7496922	1	
		BMF-RMD	527836	7497467	1	
		BMF-RMH	527556	7499316	1	
		BMF-RMQ	532706	7500443	30	

Family	Species	Site	Easting	Northing	Number of Individuals	Source
Poaceae	*Cenchrus ciliaris	BMF-RMZ	540250	7502909	1	Current Survey
		BMF03	527045	7496869	1	
		BMF09	527192	7498556	1	
		BMF12	528728	7498928	1	
		BMF13	531812	7500135	40	
		BMF15	532746	7500242	1	
		BROR42	526328	7500217	1	
		MMF09	527448	7499640	3	
		MMF12	530186	7500076	0	
		MMFOPP	526919	7500038	100	
		MMFOPP	527090	7499577	50	
		MMFOPP	530114	7500289	2	
		MMFOPP	530457	7500511	3	
		MMFOPP	531762	7500319	3	
		MMFOPP	531863	7500399	50	
		MMFR08	531780	7500506	1	
		MMFR10	530313	7500356	1	
		MMFR12	530186	7500076	5	
		BRO25	519517	7499865	1	A Vegetation and Flora Survey of the Brockman Syncline 4
		BRO27	521021	7500137	1	Project Area, near Tom Price (Biota 2005)
		OPP.	527003	7498340	Not recorded	Botanical Survey for Brockman 4 Bypass to Beasley River (Rio Tinto 2008b)
		BNV-RB	530868	7502063	20	Brockman 4 Eastern Edge Native Vegetation Clearing Permit Report (Biota 2014a)
		MMF06	528132	7500072	1	Brockman Syncline 4 Marra Mamba Vegetation and Flora Survey (Biota 2013a)
		OPP.	536703	7501090	Not recorded	Botanical Survey of the Brockman Syncline Southern Marra Mamba Deposits J, M & N (Rio Tinto 2009)
		OPP.	528777	7499062	Not recorded	BS4 Proposed ANFO Storage Area and Access Road (Pilbara
		OPP.	528839	7499192	Not recorded	Iron 2007)
Poaceae	*Cenchrus setiger	ВМF-оррММ	531845	7500043	30	Current Survey
		ВМF-оррММ	531860	7500109	20	
		ВМF-оррММ	531876	7500103	30	
		BMF-oppMM	531891	7500044	50	
		BMF-oppMM	531897	7500056	5	
Poaceae	*Setaria verticillata	BMF-oppMM	527353	7499581	5	Current Survey
		BMF-oppMM	527382	7498960	8	7
		BMF-oppMM	527392	7498983	5	7

Family	Species	Site	Easting	Northing	Number of Individuals	Source
Poaceae	*Setaria verticillata	BMF-oppMM	531896	7500959	20	Current Survey
		BMF-oppMM	540232	7502907	10	
		BMF-oppMM	540249	7502851	10	
		BMF-RMA	526682	7496851	3	
		BMF-RMR	531926	7500943	20	
		BMF09	527192	7498556	1	
		BMF11	527561	7498869	2	
		BMF12	528728	7498928	10	
		BRO23	519277	7499213	1	A Vegetation and Flora Survey of the Brockman Syncline 4 Project Area, near Tom Price (Biota 2005)
		OPP.	526952	7498350	Not recorded	Botanical Survey for Brockman 4 Bypass to Beasley River (Rio Tinto 2008b)
		MMFOPP	527090	7499577	5	Brockman Syncline 4 Marra Mamba Vegetation and Flora Survey (Biota 2013a)
Polygonaceae	*Acetosa vesicaria	BMF-OPCEF	534065	7502171	30	Current Survey
		BMF-OPCEF	534081	7502195	30	
		BMF-OPCEF	534083	7502217	200	
		BMF-OPCEF	534128	7502241	200	
		BMF-OPCEF	534132	7502269	100	
		BMF-OPCEF	534377	7502186	20	
		BMF-OPPL	534046	7500487	30	
		BMF-OPPL	534046	7500510	50	
		BMF-OPPL	537522	7502441	30	
		BMF-OPPL	537582	7502499	500	
		BMF-OPPL	537655	7502505	1000	
		ВМF-оррММ	533654	7500500	20	
		ВМF-оррММ	534284	7502239	30	
		ВМF-оррММ	534400	7502255	20	
		BMF-oppMM	534401	7502242	3	
		OPP.	536763	7503024	Not recorded	Botanical Survey of the Brockman Syncline Southern Marra Mamba Deposits J, M & N (Rio Tinto 2009)
Portulacaceae	*Portulaca pilosa	BMF08	529061	7496875	1	Current Survey

Framework for Conservation Significance Ranking of Communities and Species in WA



A. Definitions, Categories and Criteria for Threatened and Priority Ecological Communities Species and Communities Branch, Department of Environment and Conservation, December 2010.

1. General Definitions

Ecological Community

A naturally occurring biological assemblage that occurs in a particular type of habitat.

Note: The scale at which biological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified.

A **threatened ecological community** (TEC) is one which is found to fit into one of the following categories; "presumed totally destroyed", "critically endangered", "endangered" or "vulnerable".

Possible threatened ecological communities that do not meet survey criteria are added to the Department of Parks and Wildlife's Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological Communities that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

An **assemblage** is a defined group of biological entities.

Habitat is defined as the areas in which an organism and/or assemblage of organisms lives. It includes the abiotic factors (e.g. substrate and topography), and the biotic factors.

Occurrence: a discrete example of an ecological community, separated from other examples of the same community by more than 20 metres of a different ecological community, an artificial surface or a totally destroyed community.

By ensuring that every discrete occurrence is recognised and recorded future changes in status can be readily monitored.

Adequately Surveyed is defined as follows:

"An ecological community that has been searched for thoroughly in most likely habitats, by relevant experts."

Community structure is defined as follows:

"The spatial organisation, construction and arrangement of the biological elements comprising a biological assemblage" (e.g. *Eucalyptus salmonophloia* woodland over scattered small shrubs over dense herbs; structure in a faunal assemblage could refer to trophic structure, e.g. dominance by feeders on detritus as distinct from feeders on live plants).

Definitions of **Modification** and **Destruction** of an ecological community:

Modification: "changes to some or all of ecological processes (including abiotic processes such as hydrology), species composition and community structure as a direct or indirect result of human activities. The level of damage involved could be ameliorated naturally or by human intervention."

Destruction: "modification such that reestablishment of ecological processes, species composition and community structure within the range of variability exhibited by the original community is unlikely within the foreseeable future even with positive human intervention."

Note: Modification and destruction are difficult concepts to quantify, and their application will be determined by scientific judgement. Examples of modification and total destruction are cited below:

<u>Modification of ecological processes:</u> The hydrology of Toolibin Lake has been altered by clearing of the catchment such that death of some of the original flora has occurred due to dependence on fresh water. The system may be bought back to a semblance of the original state by redirecting saline runoff and pumping waters of the rising underground watertable away to restore the hydrological balance. Total destruction of downstream lakes has occurred due to hydrology being altered to the point that few of the original flora or fauna species are able to tolerate the level of salinity and/or water logging.

<u>Modification of structure:</u> The understorey of a plant community may be altered by weed invasion due to nutrient enrichment by addition of fertiliser. Should the additional nutrients be removed from the system the balance may be restored, and the original plant species better able to compete. Total destruction may occur if additional nutrients continue to be added to the system causing the understorey to be completely replaced by weed species, and death of overstorey species due to inability to tolerate high nutrient levels.

<u>Modification of species composition:</u> Pollution may cause alteration of the invertebrate species present in a freshwater lake. Removal of pollutants may allow the return of the original inhabitant species. Addition of residual highly toxic substances may cause permanent changes to water quality, and total destruction of the community.

Threatening processes are defined as follows:

"Any process or activity that threatens to destroy or significantly modify the ecological community and/or affect the continuing evolutionary processes within any ecological community."

Examples of some of the continuing threatening processes in Western Australia include: general pollution; competition, predation and change induced in ecological communities as a result of introduced animals; competition and displacement of native plants by introduced species; hydrological changes; inappropriate fire regimes; diseases resulting from introduced micro-organisms; direct human exploitation and disturbance of ecological communities.

Restoration is defined as returning an ecological community to its pre-disturbance or natural state in terms of abiotic conditions, community structure and species composition.

Rehabilitation is defined as the re-establishment of ecological attributes in a damaged ecological community although the community will remain modified.

2. Definitions and Criteria for Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable Ecological Communities

ECOLOGICAL COMMUNITIES

Presumed Totally Destroyed (PD)

An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.

An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B):

- A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or
- B) All occurrences recorded within the last 50 years have since been destroyed

Critically Endangered (CR)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.

An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):

- A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii):
 - geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years);
 - ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated.
- B) Current distribution is limited, and one or more of the following apply (i, ii or iii):
 - i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years);

- ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes;
- iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.
- C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).

Endangered (EN)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C):

- A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):
 - i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years);
 - ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.
- B) Current distribution is limited, and one or more of the following apply (i, ii or iii):
 - i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years);
 - ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes;
 - iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.
- C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

Vulnerable (VU)

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):

- A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.
- B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.
- C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

3. Definitions and Criteria for Priority Ecological Communities

PRIORITY ECOLOGICAL COMMUNITY LIST

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as threatened ecological communities. Ecological Communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

Priority One: Poorly-known ecological communities

Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Priority Two: Poorly-known ecological communities

Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Priority Three: Poorly known ecological communities

- (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:
- communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;
- (iii) communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

Priority Four: Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.

- (a) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.
- (b) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.
- (c) Ecological communities that have been removed from the list of threatened communities during the past five years.

Priority Five: Conservation Dependent ecological communities

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

B. Conservation Significant Flora and Fauna – Formal Framework

In Western Australia, all native flora and fauna species are protected under the *Wildlife Conservation Act* 1950, making it an offence to take these without approval. The definition of 'take' is broad, and encompasses killing, capturing or disturbing fauna, and destroying, gathering, cutting or injuring flora. In addition to this basic level of statutory protection, a number of species are assigned an additional level of conservation significance based on the fact that there are a limited number of known populations, some of which may be under threat.

Such species are classified within a framework of 11 categories. Species of the highest conservation significance are designated as Threatened within four categories (Critically Endangered: CR, Endangered: EN, Vulnerable: V, and Presumed Extinct: EX). These represent those species listed in Schedules 1 to 4 of the annual Wildlife Conservation (Specially Protected Fauna) Notice and Wildlife Conservation (Rare Flora) Notice. Migratory birds that are protected under various international agreements are assigned to a separate category (IA). Conservation dependent fauna (species listed under Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice) and other specially protected fauna (those listed in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice) comprise two additional categories (Conservation Dependent: CD, and Other Specially Protected: OS). Species that appear to be rare or threatened, but for which there is insufficient information to properly evaluate their conservation significance, are assigned to one of three Priority categories (Priority 1 to Priority 3), while species that are adequately known but require regular monitoring are assigned to Priority 4. The 11 categories are explained in more detail on the following pages.

Note that of the above classifications, only the 'Threatened' categories have statutory standing. The Priority flora and fauna classifications are employed by the WA Department of Parks and Wildlife to manage and classify their database of species considered potentially rare or at risk, but these categories have no legislative status. Note also that proposals that appear likely to affect Threatened flora require formal written approval from the Minister for the Environment under Section 23(f) of the Wildlife Conservation Act 1950, in addition to the requirements of the Environmental Protection (Native Vegetation Clearing) Regulations 2004.

Many of the species that are specially protected at State level are also listed as Threatened species at the Federal level, as one of the Matters of National Environmental Significance (MNES) identified under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act). In addition, numerous Migratory species are listed as MNES under the EPBC Act (some of which are also listed as Threatened). The national List of Migratory Species consists of those species listed under the following International Conventions:

- Japan-Australia Migratory Bird Agreement;
- China-Australia Migratory Bird Agreement; and
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Under the terms of the EPBC Act, an action (e.g. a project or development) is required to be referred to the Australian Government Environment Minister for approval if it has, will have, or is likely to have, a significant impact on an MNES. The term 'action' includes projects and developments subsequent to commencement of the Act, however there are a number of exemptions (e.g. projects in Commonwealth areas). According to Department of the Environment (2013), a 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

References:

Department of the Environment (2013). Matters of National Environmental Significance - Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999. Commonwealth of Australia.



CONSERVATION CODES

For Western Australian Flora and Fauna

Specially protected fauna or flora are species* which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such.

Categories of specially protected fauna and flora are:

T Threatened species

Published as Specially Protected under the *Wildlife Conservation Act 1950*, and listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).

Threatened fauna is that subset of 'Specially Protected Fauna' declared to be 'likely to become extinct' pursuant to section 14(4) of the Wildlife Conservation Act.

Threatened flora is flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F(2) of the Wildlife Conservation Act.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR Critically endangered species

Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

EN Endangered species

Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

VU Vulnerable species

Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

EX Presumed extinct species

Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.

IA Migratory birds protected under an international agreement

Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.

CD Conservation dependent fauna

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.

OS Other specially protected fauna

Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.

P Priority species

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

1 Priority 1: Poorly-known species

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

2 Priority 2: Poorly-known species

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

3 Priority 3: Poorly-known species

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

4 Priority 4: Rare, Near Threatened and other species in need of monitoring

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

*Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

Last updated 11 November 2015

Conservation Significant Flora Recorded within 40 km of the Study Area and their Likelihood of Occurring



			Databases					Past S	urveys	5	Likelihood of Occurrence within Study Area		
Species	Habit (Department of Parks and Wildlife 2015b)	Habitat (Department of Parks and Wildlife 2015b)	Nature Map	TPFL	WA Herbarium	RTIO Database	Biota ¹¹	Astron ¹²	Eco Logical ¹³	Rio Tinto (2009)	Initial Ranking Based on Desktop Review	Final Ranking Including Results of 2015 Survey	
Priority 1													
Abutilon sp. Pritzelianum (S. van Leeuwen 5095)	Shrub.	Sand-plains with orange- brown sandy loam.				*					Unlikely to occur: no particularly suitable habitat present and very infrequently recorded within the locality (a single record 15 km north of the study area).	Unlikely to occur.	
Bothriochloa decipiens var. cloncurrensis	Perennial grass.	Loam to clay-loam in seasonally damp depressions.				•	•				May potentially occur: suitable habitat within the study area, however only two records in close proximity (5 km southeast)	May potentially occur.	
Calotis squamigera	Annual herb.	Pebbly loam on plains.				•	•				Unlikely to occur: some suitable habitat but rarely recorded from the locality.	Unlikely to occur.	
Euphorbia inappendiculata var. queenslandica	Prostrate annual herb.	Cracking clay and clay plains.				*	*	¥			Unlikely to occur: some suitable habitat along southern boundary of the study area, however recorded very infrequently from the locality.	Unlikely to occur.	
Goodenia pedicellata	Single-stemmed perennial herb.	Rocky clayey soils; rocky slopes and crests of small hills; calcrete.	*		*	*		*			Likely to occur; suitable habitat (calcrete) is present and there are numerous records from 18 – 24 km southeast.	Recorded: a total of 21 individuals were recorded from two locations.	
Helichrysum oligochaetum	Erect annual herb.	Red clay and alluvial plains.				~					Unlikely to occur; recorded very infrequently in the locality.	Unlikely to occur.	
Hibiscus sp. Mt Brockman (E. Thoma ET 1354)	Erect spindly shrub.	Range crests and slopes.	•		*	*		*	*		Previously recorded (71 individuals from three populations).	A total of 75 individuals were recorded from 15 additional locations. comprising three additional populations.	
Sida sp. Hamersley Range (K. Newbey 10692)	Low shrub.	Skeletal stony soils; rocky hills, breakaways.	•	•		-				-	Previously recorded (52 individuals from four populations).	A total of 278 individuals were recorded from an additional 89 locations.	

¹¹ Biota (2005, 2007a, 2013f, 2013h, 2014a, 2014c, 2014f, 2014g, 2015, 2009a, 2010c, 2010e, 2012a, 2012b, 2012c, 2013a, 2013d).

¹² Astron (2014a, 2014b, 2014c, 2014d).

¹³ Eco Logical Australia (2013b, 2013c, 2013d, 2014a, 2014b, 2014c).

				Data	bases			Past S	urveys	;	Likelihood of Occurrence	within Study Area
Species	Habit (Department of Parks and Wildlife 2015b)	Habitat (Department of Parks and Wildlife 2015b)	Nature Map	TPFL	WA Herbarium	RTIO Database	Biota ¹¹	Astron ¹²	Eco Logical ¹³	Rio Tinto (2009)	Initial Ranking Based on Desktop Review	Final Ranking Including Results of 2015 Survey
Teucrium pilbaranum	Low perennial herb or shrub.	Clay, floodplains, margins of calcrete table.				•		*			May potentially occur: some suitable habitat present in the study area but recorded infrequently in the locality.	Unlikely to occur; not recorded during representative searches in areas of suitable habitat; species would probably have been encountered if present in the area.
Priority 2												
Euphorbia inappendiculata var. inappendiculata	Prostrate annual herb.	Silty cracking clay, floodplains and gentle slopes.	•								Unlikely to occur; recorded very infrequently in the locality.	Unlikely to occur.
Euphorbia australis var. glabra	Annual herb	Moderately drained clay. Extensive sub-saline flats.				•	•				Unlikely to occur; limited suitable habitat and recorded very infrequently in the locality.	Unlikely to occur.
Hibiscus sp. Gurinbiddy Range (M.E. Trudgen MET 15708)	Spindly tall shrub.	Hilltops and upper hill- slopes.				*		*			May potentially occur; suitable habitat within the study area, but the species is recorded very infrequently in the locality (a single record ~13 km north of the study area).	Recorded: a total of 79 individuals recorded from 24 locations.
Indigofera ixocarpa	Low shrub.	Skeletal red soils over massive ironstone.				*					Unlikely to occur; suitable habitat (hills) is present, however this species is recorded infrequently in the locality (closest records are approx. 38 km southeast).	Unlikely to occur.
lpomoea racemigera	Creeping annual herb.	Drainage lines and creek beds.				1	1				Likely to occur; some suitable habitat (moderate-sized creeklines) is present and species has been recorded frequently in close proximity (closest record 2.8 km southeast of the study area).	Unlikely to occur; not recorded during the current survey despite representative searches through drainage lines and creek beds. Creeklines in the study area are generally smaller in scale than those from which the species has typically been recorded.
Oxalis sp. Pilbara (M.E. Trudgen 12725)	Annual herb.	Hill slopes and gorges on loam.				•	•				Unlikely to occur; suitable habitat present but recorded very infrequently in the locality.	Recorded: a total of 53 individuals at three locations.
Pentalepis trichodesmoides subsp. hispida	Erect shrub	High in landscape on gravelly loam.				•	•				May potentially occur; suitable habitat present but recorded infrequently in the locality.	Recorded: a single individual at one location.

				Data	bases			Past S	urveys		Likelihood of Occurrence within Study Area	
Species	Habit (Department of Parks and Wildlife 2015b)	Habitat (Department of Parks and Wildlife 2015b)	Nature Map	TPFL	WA Herbarium	RTIO Database	Biota ¹¹	Astron ¹²	Eco Logical ¹³	Rio Tinto (2009)	Initial Ranking Based on Desktop Review	Final Ranking Including Results of 2015 Survey
Priority 3												
Aristida jerichoensis var. subspinulifera	Tufted perennial grass.	Hardpan plains.	•			•	~				May potentially occur; some suitable habitat but recorded infrequently in the locality.	May potentially occur.
Astrebla lappacea	Tufted perennial grass.	Clay to clay-loam on plains.	1			1	•	•			May potentially occur; not recorded in close proximity, however there are numerous records 30–45 km north/northeast of study area; some suitable habitat present along southern boundary of study area.	Unlikely to occur; not recorded during representative searches in the areas of clay; species would probably have been encountered if present.
Dampiera anonyma	Low perennial shrub.	Skeletal soils over banded ironstone; hill summits, slopes (above 1,000 m).	*		*		*				Unlikely to occur; no slopes or crests at sufficiently high elevation.	Unlikely to occur.
Eragrostis surreyana	Tufted annual grass.	Seasonally wet, shallow, grey alluvial soils over rock.					~				Unlikely to occur; recorded very infrequently in the locality and no suitable habitat in the study area.	Unlikely to occur.
Eremophila magnifica subsp. velutina	Shrub.	Skeletal soils over ironstone on tall hills and breakaways.	*	1	*	•		•			May potentially occur: suitable habitat present and recorded within 20 km to the northeast and southeast.	Recorded; a single individual at one location.
Geijera salicifolia	Tree.	Skeletal soils. Massive rock scree, gorges.				*	*				May potentially occur; typically occurs on basalt rockpiles, which are absent from the study area, however there are occasional records from rocky free faces on hillslopes; recorded infrequently in the locality.	Unlikely to occur; not recorded during representative searches in areas of suitable habitat. This conspicuous tree species would have been encountered if present.
Glycine falcata	Perennial herb.	Occurs mainly on clay along drainages and on plains.	*			~		*			May potentially occur; some suitable habitat but recorded infrequently in the locality.	May potentially occur.
Goodenia sp. East Pilbara (A.A. Mitchell PRP 727)	Annual to biennial herb.	Low undulating plains, calcrete.	•	•	•	*					May potentially occur; suitable habitat is present, however as far as we are aware, records from the locality (33 km northeast) probably represent <i>Goodenia pedicellata</i> .	Unlikely to occur; not recorded during representative searches in areas of calcrete.
Grevillea saxicola	Small tree or shrub.	Steep, rocky hill slopes, often with Mulga.	~		•	¥	•				Likely to occur; suitable habitat present and recorded 1 km south of the study area.	May potentially occur; not recorded during any of the representative searches in areas of suitable habitat, however not all suitable habitat was searched.

				Data	bases			Past S	urveys	5	Likelihood of Occurrence	within Study Area
Species	Habit (Department of Parks and Wildlife 2015b)	Habitat (Department of Parks and Wildlife 2015b)	Nature Map	TPFL	WA Herbarium	RTIO Database	Biota ¹¹	Astron ¹²	Eco Logical ¹³	Rio Tinto (2009)	Initial Ranking Based on Desktop Review	Final Ranking Including Results of 2015 Survey
Gymnanthera cunninghamii	Erect shrub.	Sandy soils of drainage lines and floodplains.	•			~	•				May potentially occur; some suitable habitat is present however this species is recorded infrequently in locality.	Unlikely to occur; not recorded during representative searches in areas of suitable habitat; this conspicuous shrub species would have been encountered if present.
lotasperma sessilifolium	Erect herb.	Cracking clay, black loam; edges of waterholes, plains.	*			*	~				Unlikely to occur; some suitable habitat present but recorded very infrequently in the locality.	Unlikely to occur.
Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301)	Low to medium shrub.	Drainage lines.	*		~	~	•	*	*		Likely to occur: some suitable habitat present, and previously recorded in close proximity (closest record 2 km north).	May potentially occur; not recorded during representative searches in drainage lines, however this species sometimes occurs as very isolated populations.
Indigofera gilesii	Erect shrub.	Rocky slopes, gorges, creeklines.				~					May potentially occur; suitable habitat is present but this species is recorded infrequently in the locality.	Unlikely to occur; not recorded during representative searches in areas of suitable habitat, the species would have been encountered if present.
Nicotiana umbratica	Erect, short-lived annual or perennial herb.	Shallow soils, rock outcrops, riverbeds.	•		~	•	•				May potentially occur; suitable habitat present but recorded infrequently in the locality; existing records in close proximity to the study area (13 km southeast).	May potentially occur.
Oldenlandia sp. Hamersley Station (A.A. Mitchell PRP 1479)	Spreading, annual herb.	Cracking clay.				•	*				Likely to occur: suitable habitat present and numerous records in close proximity, including a record 2.5 km southwest of the southern section of the study area.	Recorded: a total of 954 individuals were recorded from 14 locations.
Olearia mucronata	Low shrub.	Schistose hills and along drainage channels.				1					Unlikely to occur; suitable habitat present but recorded very infrequently in the locality.	Unlikely to occur.
Pleurocarpaea gracilis	Perennial herb.	Skeletal gritty soil over ironstone on summits and slopes.				-			•		Unlikely to occur; suitable habitat present but recorded very infrequently in the locality.	Unlikely to occur.

		Habitat (Department of Parks and Wildlife 2015b)		Data	bases			Past S	urveys	;	Likelihood of Occurrence within Study Area		
Species	Habit (Department of Parks and Wildlife 2015b)		Nature Map	TPFL	WA Herbarium	RTIO Database	Biota ¹¹	Astron ¹²	Eco Logical ¹³	Rio Tinto (2009)	Initial Ranking Based on Desktop Review	Final Ranking Including Results of 2015 Survey	
Ptilotus subspinescens	Low shrub.	Stony plains and gentle rocky scree slopes with a calcareous substrate; semi-saline colluvial plains.	*	*	*	*	*				Previously recorded (1,475 individuals from seven populations).	A total of 695 individuals were recorded from an additional 38 locations.	
Rhagodia sp. Hamersley Station (M. Trudgen 17794)	Shrub.	Under Mulga, usually on clay plains.	*		*	*					May potentially occur; some suitable habitat present and recorded in the locality.	Unlikely to occur; not recorded during representative searches in areas of Mulga. This conspicuous shrub species should have been encountered if present.	
Rostellularia adscendens var. latifolia	Herb or low shrub.	Various; creeks, rocky hills, calcrete.	1		•	*	•				Likely to occur; extensive suitable habitat present and frequently recorded in the locality, including in close proximity.	Likely to occur.	
Sida sp. Barlee Range (S. van Leeuwen 1642)	Low spreading shrub.	Skeletal soils on steep rocky slopes.	•		•	1	•	*	*		Likely to occur: suitable habitat present and frequently recorded in the locality, including in close proximity.	May potentially occur; not recorded during representative searches in gullies and free faces, however not all suitable habitat was searched.	
Solanum kentrocaule	Erect shrub.	Basalt scree, hillsides and tops, gorges.				*	•				May potentially occur; suitable habitat present but the species is recorded infrequently in the locality.	May potentially occur.	
Swainsona thompsoniana	Prostrate annual herb.	Cracking clay soils and open floodplains.	*			*	•	•			May potentially occur; some suitable habitat and numerous records located between 15 km and 30 km north.	May potentially occur.	
Themeda sp. Hamersley Station (M.E. Trudgen 11431)	Annual tussock grass.	Clay pans, grass plains.	*			~	*	*			May potentially occur; some suitable habitat and numerous records located between 16 km and 30 km north/northeast.	Unlikely to occur; not recorded during representative searches in the areas of clay. This conspicuous grass species would have been encountered, if present in these areas.	

				Data	bases			Past S	urveys	;	Likelihood of Occurrence	within Study Area
Species	Habit (Department of Parks and Wildlife 2015b)	Habitat (Department of Parks and Wildlife 2015b)	Nature Map	TPFL	WA Herbarium	RTIO Database	Biota ¹¹	Astron ¹²	Eco Logical ¹³	Rio Tinto (2009)	Initial Ranking Based on Desktop Review	Final Ranking Including Results of 2015 Survey
Triodia basitricha	Perennial hummock grass.	Rocky low hillcrests and footslopes.					*				Recorded. [NB. This was only following re-determination of some specimens that had been identified as <i>Triodia melvillei</i> from previous surveys at Marra Mamba (Biota 2013a), White Quartz Road (Biota 2007a) and BS4 Eastern Edge (Biota 2014a).]	Recorded: over 3,170 individuals recorded from an additional 20 locations.
Triodia sp. Robe River (M.E. Trudgen et al. MET 12367)	Perennial hummock grass.	Rocky skeletal slopes and free-faces of mesas and hills.				•			•		Would not occur; no suitable habitat and species' range is currently thought to be very restricted.	Would not occur.
Vittadinia pustulata	Annual herb.	Floodplains and sandy flats near dunes.				•	•				Unlikely to occur; recorded very infrequently in the locality.	Unlikely to occur.
Priority 4												
Acacia bromilowiana	Tree or shrub.	Skeletal loamy soils on rocky hills, breakaways, scree slopes, gorges and associated creek beds.	•		*	*	•	*			Likely to occur; suitable habitat present and records in close proximity (closest is 13 km north).	Recorded: a total of 96 individuals recorded from seven locations.
Eremophila magnifica subsp. magnifica	Shrub.	Rocky slopes of tall hills, breakaways.	•				~		•		Likely to occur; recorded frequently in the locality, including in close proximity (numerous records between 900 m and 2.2 km east).	May potentially occur; not recorded during representative searches in areas of suitable habitat, however not all suitable habitat was searched.
Goodenia nuda	Herb.	Clay loam to clay soils, particularly in drainage areas.	•		~	•	*				Likely to occur; suitable habitat present and numerous records in close proximity, including a record 3 km southwest.	Recorded: a total of 10 individuals recorded from a single location.
Livistona alfredii	Tree-like palm.	Permanent pools and watercourses.				•	•				Would not occur; no suitable habitat.	Would not occur.
Ptilotus mollis	Compact perennial shrub.	Stony hills and screes.	*		~		*		•		May potentially occur: suitable habitat present and a record from 11 km south-southeast, but infrequently recorded in the locality.	Unlikely to occur; not recorded during any of the representative searches in areas of stony hills and screes.
Ptilotus trichocephalus	Prostrate herb.	Sandy soils, colluvial plains.	•	~	~	~	•				May potentially occur: suitable habitat present and records from 10 km south.	May potentially occur.

Lehit				Data	bases			Past S	urveys		Likelihood of Occurrence within Study Area		
Species	Habit (Department of Parks and Wildlife 2015b)	Habitat (Department of Parks and Wildlife 2015b)	Nature Map	TPFL	WA Herbarium	RTIO Database	Biota ¹¹	Astron ¹²	Eco Logical ¹³	Rio Tinto (2009)	Initial Ranking Based on Desktop Review	Final Ranking Including Results of 2015 Survey	
Rhynchosia bungarensis	Prostrate shrub.	Coarse sand amongst boulders along moderate-sized to major creeklines and on associated floodplains.				•	1				Unlikely to occur; no particularly suitable habitat present and recorded very infrequently in the locality.	Unlikely to occur.	
Threatened under the Co	ommonwealth EPBC	Act; Priority 4 in WA											
Lepidium catapycnon	Perennial herb or shrub.	Skeletal soils on stony plains and hill slopes.	•	1		*				¥	May potentially occur: considerable suitable habitat (stony hills) in the study area; previously recorded 7 km to the northeast of the study area, but there are no records from BS4 to date despite extensive survey effort.	May potentially occur.	

Vegetation Condition Mapping, Including Weed Locations













