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Supplementary table 1: Reclassification scheme applied to the national land cover data products. The data for each time point were reclassified from the 72 classes in the national land cover scheme to a simplified scheme with seven land-cover classes, of which six represent non-natural classes and one represents the natural habitat class. A full analysis of the range of shifts, transitions and replacements between the full schemes of classes is beyond the scope of this study but Supplementary table 2 presents an overall transition matrix and Supplementary table 3 presents biome-specific transition matrices for the period 1990–2018.

Class	Natural [†]	Not natural					
Level 1	Natural and near natural areas	Areas where original natural habitat has been replaced by anthropogenic land cover/use					
Level 2	Natural and near natural areas	Croplands and intensive agri-culture (e.g. feedlots)	Built-up areas and infrastructure	Plantation forestry areas	Mines and associated infrastructure	Artificial waterbodies (dams, water works, sewage plants)	Secondary natural (abandoned croplands and recovering mines)
Level 3 Original National Land Cover Classification Scheme	All vegetated areas (grasslands, shrublands, thickets, forests, woodlands etc.), natural bare areas (sand dunes, rock surfaces, deserts with very low vegetation cover), natural water bodies including estuaries	All croplands (field crops, orchards and vineyards, pivots) and irrigated areas, human settlements and commercial and industrial areas, mining areas, artificial water bodies (dams, water works and sewage plants), plantation forestry areas (using non-native tree species) and erosion					

[†]The national land-cover products do not include classes indicating land degradation (overgrazing and disrupted fire regimes etc.). As a result, the ‘Natural’ class is more appropriately referred to as semi-natural or near natural.

Supplementary table 2: Transitions between land-cover classes for 1990 and 2018. ‘Artificial water bodies’ were added to the land-cover data set using a range of additional data sources. ‘Natural’ to ‘Secondary natural’ transitions between 1990 and 2018 are the result of conversion of natural habitat to anthropogenic land cover between 1990 to 2014; followed by a transition back to ‘Natural’ between 2014 and 2018. Biome level tables can be found in Supplementary table 3.

		2018									
All biomes	1990	Natural	Artificial waterbody	Built up	Cropland	Erosion	Mine	Plantation	Secondary natural	Grand Total	% of SA
		Natural	951822	652	6237	11508	262	976	4604	9567	985628
Artificial waterbody		5629							5629	0.5%	
Built up		4	23438	1484	6	71	68	2261	27332	2.2%	
Cropland		57	511	121416	40	370	416	18623	141433	11.6%	
Erosion		1	9	20	724	3	0	530	1287	0.1%	
Mine		66	18	15	9	1347	27	1351	2834	0.2%	
Plantation		16	418	287	2	42	14688	3680	19133	1.6%	
Secondary natural		64	764	3249	248	112	718	30909	36066	3.0%	
Grand Total	951822	6490	31396	137980	1291	2920	20522	66922	1219342		
% of SA	78.1%	0.5%	2.6%	11.3%	0.1%	0.2%	1.7%	5.5%			

Supplementary table 3: Transitions between land-cover classes for 1990 and 2018 (km²) for each biome. ‘Artificial water bodies’ were added to the land-cover data set using a range of additional data sources. ‘Natural’ to ‘Secondary natural’ transitions between 1990 and 2018 are the result of conversion of natural habitat to anthropogenic land cover between 1990 to 2014, followed by a transition back to ‘Natural’ between 2014 and 2018.

		2018								
		Natural	Artificial waterbody	Built up	Cropland	Erosion	Mine	Plantation	Secondary natural	Grand Total
1990	Albany Thicket	31988	13	139	211	0	5	22	106	32486
	Natural									
	Artificial waterbody		142							142
	Built up		0	409	16	0	0	1	69	495
	Cropland		0	1	1358	0	0	5	232	1596
	Erosion									
	Mine		2	0	0	0	4	0	18	24
	Plantation		0	1	5	0	0	29	11	46
	Secondary natural		0	3	21	0	0	2	492	518
	Grand Total	31988	157	554	1610	0	10	57	929	35307

		2018								
		Natural	Artificial waterbody	Built up	Cropland	Erosion	Mine	Plantation	Secondary natural	Grand Total
1990	Indian Ocean Coastal Belt	3945	4	246	205	0	7	170	304	4882
	Natural									
	Artificial waterbody		16							16
	Built up		0	2074	239	0	2	28	154	2496
	Cropland		1	15	1886	0	3	17	155	2076
	Erosion									0
	Mine		0	0	0	0	3	2	2	7
	Plantation		1	60	23	0	6	1033	242	1364
	Secondary natural		0	24	42	1	2	29	751	849
	Grand Total	3945	23	2419	2396	1	22	1278	1608	11692

		2018								
		Natural	Artificial waterbody	Built up	Cropland	Erosion	Mine	Plantation	Secondary natural	Grand Total
1990	Desert	6142	7	5	2		24	0	1	6181
	Natural									
	Artificial waterbody		1							1
	Built up			4	0		0		1	5
	Cropland		0	0	5		0	0	3	8
	Erosion									
	Mine		0	0			61		5	66
	Plantation		0	0					1	1
	Secondary natural			0	0		0		2	2
	Grand Total	6142	8	8	7		85	0	12	6262

		2018								
		Natural	Artificial waterbody	Built up	Cropland	Erosion	Mine	Plantation	Secondary natural	Grand Total
1990	Nama-Karoo	244192	79	153	513	31	67	20	165	245220
	Natural									
	Artificial waterbody		752							752
	Built up		0	117	8	0	0	0	31	157
	Cropland		1	1	1597	0	3	2	341	1946
	Erosion		0	0	0	189	0		85	274
	Mine		2	0	0	0	74	0	80	157
	Plantation		0	1	1	0	0	6	7	14
	Secondary natural		1	0	37	1	0	1	793	833
	Grand Total	244192	835	273	2156	221	145	30	1502	249354

		2018								
		Natural	Artificial waterbody	Built up	Cropland	Erosion	Mine	Plantation	Secondary natural	Grand Total
1990	Forests	3882	1	6	30	0	5	3	60	3987
	Natural									
	Artificial waterbody		1							1
	Built up		0	18	2		0	0	49	69
	Cropland		0	0	50			0	15	66
	Erosion								0	0
	Mine			0			0	0	0	1
	Plantation		1	0	1		3	28	427	460
	Secondary natural		0	0	4		0	0	123	128
	Grand Total	3882	2	25	87	0	8	32	674	4711

		2018								
		Natural	Artificial waterbody	Built up	Cropland	Erosion	Mine	Plantation	Secondary natural	Grand Total
1990	Savanna	316482	156	2950	4237	92	380	489	2966	327752
	Natural									
	Artificial waterbody		1017							1017
	Built up		1	10304	489	3	24	6	905	11733
	Cropland		19	204	26136	16	73	72	8210	34729
	Erosion		0	6	18	250	2	0	341	617
	Mine		21	10	5	4	445	3	579	1067
	Plantation		7	79	68	0	1	2340	586	3081
	Secondary natural		16	414	980	97	32	67	12297	13903
	Grand Total	316482	1237	13967	31932	463	957	2977	25884	393900

		2018								
		Natural	Artificial waterbody	Built up	Cropland	Erosion	Mine	Plantation	Secondary natural	Grand Total
1990	Fynbos	54918	53	368	1653	0	24	146	830	57992
	Natural									
	Artificial waterbody		466							466
	Built up		0	834	34	0	1	2	203	1075
	Cropland		6	29	16309	1	4	22	1910	18279
	Erosion									
	Mine		1	0	1	0	13	0	15	30
	Plantation		5	26	46	0	0	875	428	1380
	Secondary natural		8	41	404	1	4	34	1930	2422
	Grand Total	54918	539	1298	18447	2	46	1078	5317	81644

		2018								
		Natural	Artificial waterbody	Built up	Cropland	Erosion	Mine	Plantation	Secondary natural	Grand Total
1990	Succulent Karoo	74386	14	59	181	0	111	4	153	74910
	Natural									
	Artificial waterbody		126							126
	Built up		0	71	1	0	1	0	13	86
	Cropland		0	2	1561	0	3	1	256	1824
	Erosion									
	Mine		1	0	0	4	305		78	388
	Plantation		0	1	0			1	1	3
	Secondary natural		0	1	25	1	0	0	844	872
	Grand Total	74386	142	134	1769	5	420	6	1346	78208

		2018								
		Natural	Artificial waterbody	Built up	Cropland	Erosion	Mine	Plantation	Secondary natural	Grand Total
1990	Grassland	193631	266	2244	4117	137	330	3708	4794	209226
	Natural									
	Artificial waterbody		2641							2641
	Built up		2	9488	683	2	43	30	799	11047
	Cropland		28	254	69744	21	280	292	7104	77723
	Erosion		0	3	3	283	1	0	99	388
	Mine		26	7	8	2	402	22	544	1011
	Plantation		3	246	136	1	32	10341	1953	12712
	Secondary natural		39	278	1700	146	74	584	13280	16099
	Grand Total	193631	3006	12518	76390	593	1161	14976	28572	330847

		2018								
		Natural	Artificial waterbody	Built up	Cropland	Erosion	Mine	Plantation	Secondary natural	Grand Total
1990	Azonal Vegetation	21338	54	63	354	1	20	41	182	22055
	Natural									
	Artificial waterbody		465							465
	Built up		0	108	13	0	0	1	31	152
	Cropland		2	6	2761	1	4	6	392	3171
	Erosion		0	0	0	3	0		5	8
	Mine		6	0	1	0	37	0	29	73
	Plantation		0	5	6	0	0	36	24	72
	Secondary natural		0	2	35	2	1	2	391	432
	Grand Total	21338	528	184	3170	7	62	87	1052	26428