The 2022 South African National Land Cover Data and its Operational use

National NCA Forum: 7 August 2024, Stats SA

CHIEF DIRECTORATE: ENVIRONMENTAL KNOWLEDGE AND INFORMATION

forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

2030 NDP

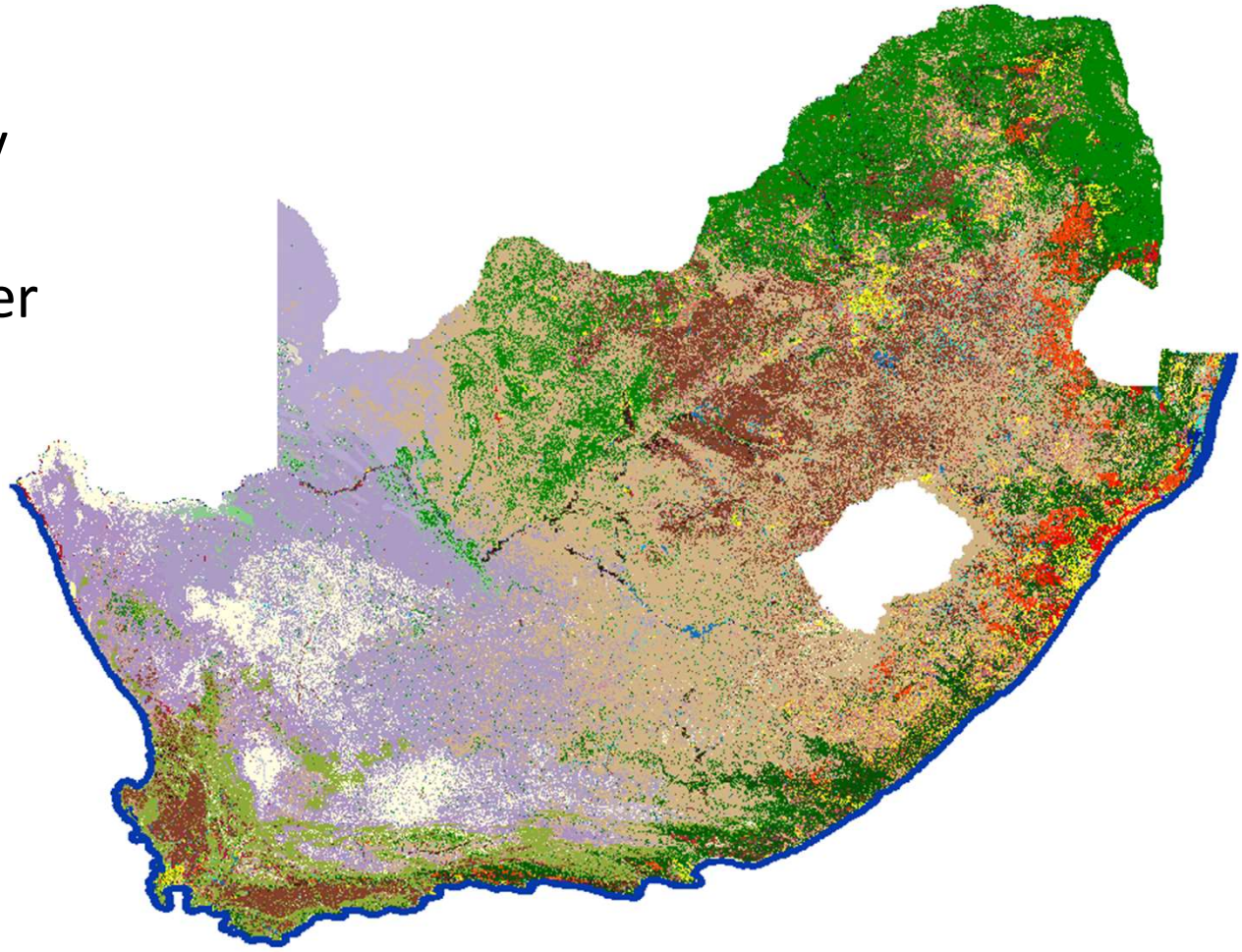
Purpose

- To brief the NCA forum on the release of the 2022 National Land Cover and Land Cover Change Datasets

- To give a technical overview of the 2022 South African National Land Cover and the Land Cover Change Data and its Operational Use

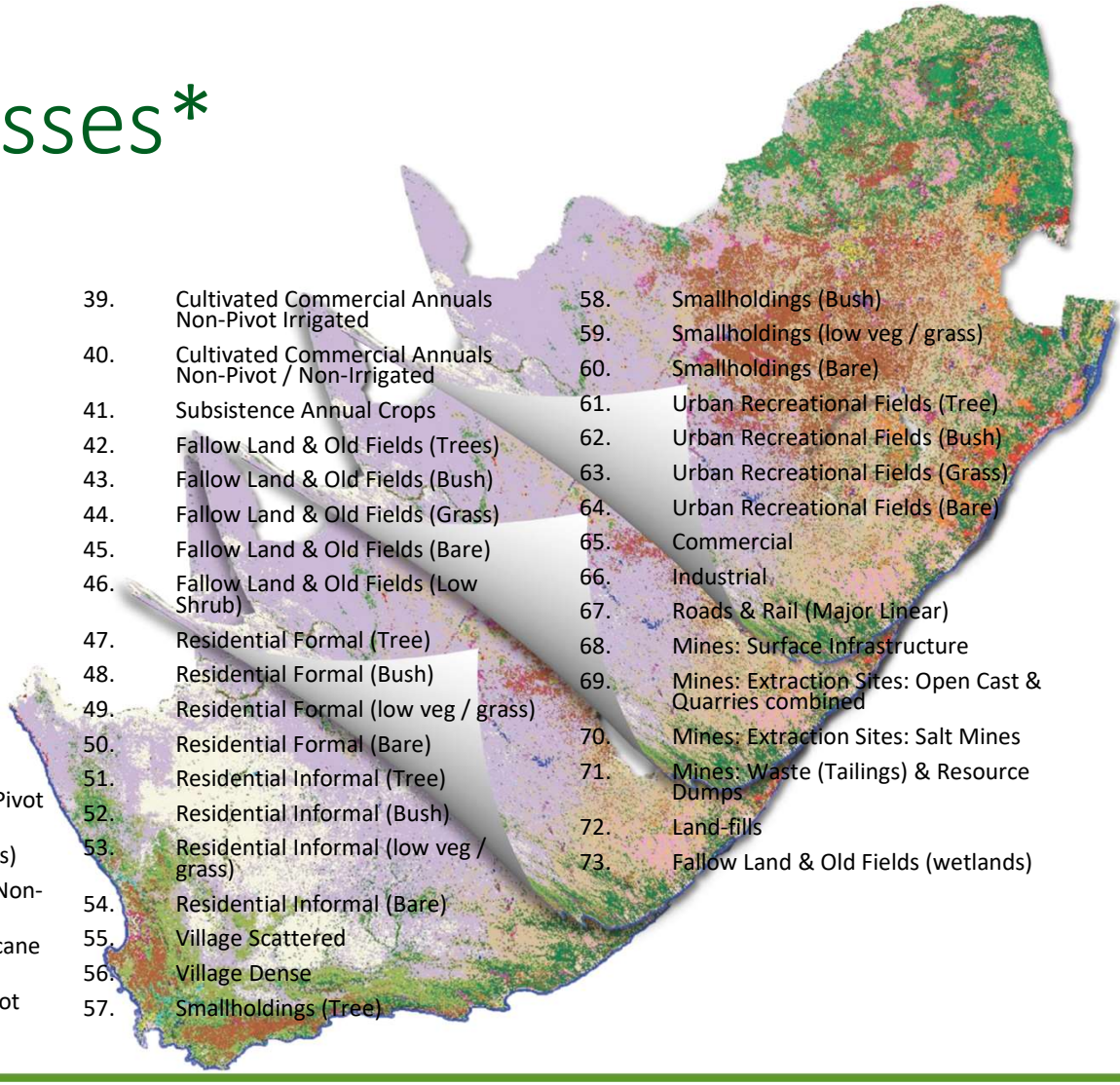
2022 South African National Land Cover (SANLC)

- Sentinel 2 Multispectral Imagery
- Computer Automated Land Cover (CALC)
- 12 Geographic Masks



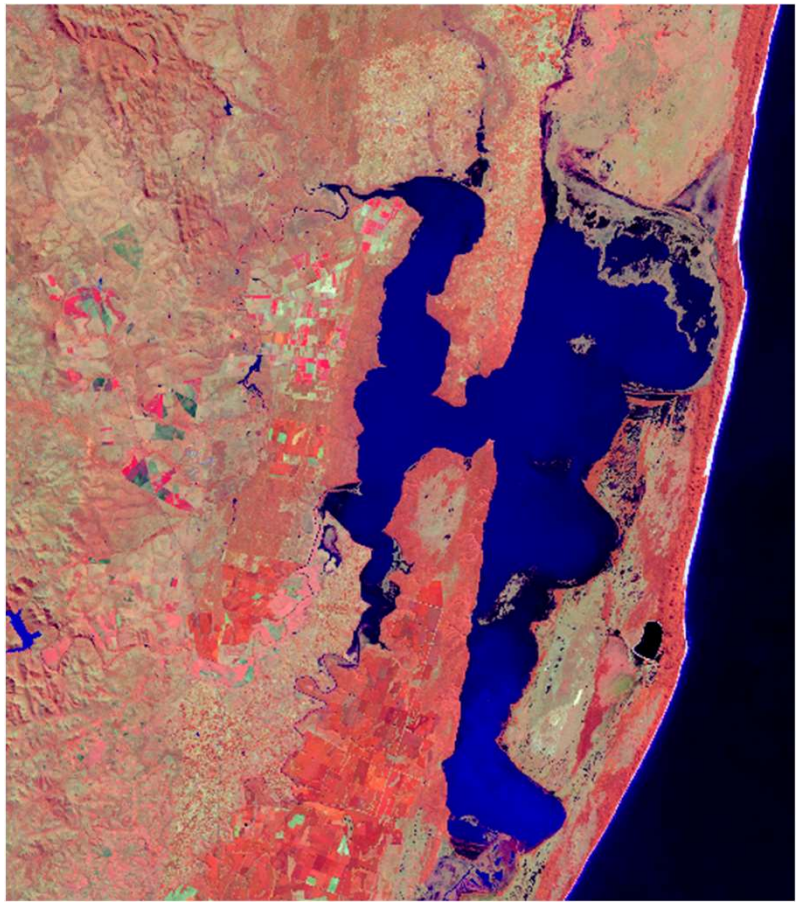
The 73 Land-Cover Classes*

1. Contiguous Forest (combined very high, high, medium)
2. Contiguous Low Forest & Thicket
3. Dense Forest & Woodland
4. Open Woodland
5. Contiguous & Dense Planted Forest
6. Open & Sparse Planted Forest
7. Temporary Unplanted Forest
8. Low Shrubland (other regions)
9. Low Shrubland (Fynbos)
10. Low Shrubland (Succulent Karoo)
11. Low Shrubland (Nama Karoo)
12. Sparsely Wooded Grassland
13. Natural Grassland
14. Natural Rivers
15. Natural Estuaries & Lagoons
16. Natural Ocean
17. Natural Lakes
18. Natural Pans (flooded)
19. Artificial Dams
20. Artificial Sewage Ponds
21. Artificial Flooded Mine Pits
22. Herbaceous Wetlands (currently mapped)
23. Herbaceous Wetlands (previous mapped extent)
24. Mangrove Wetlands
25. Natural Rock Surfaces
26. Dry Pans
27. Eroded Lands
28. Sand Dunes (terrestrial)
29. Coastal Dunes & Beach Sand
30. Bare Riverbed Material
31. Other Bare
32. Cultivated Commercial Permanent Orchards
33. Cultivated Commercial Permanent Vines
34. Cultivated Commercial Sugarcane Pivot Irrigated
35. Commercial Permanent (Pineapples)
36. Cultivated Commercial Sugarcane Non-Pivot (all other)
37. Cultivated Emerging Farmer Sugarcane Non-Pivot (all other)
38. Cultivated Commercial Annuals Pivot Irrigated
39. Cultivated Commercial Annuals Non-Pivot Irrigated
40. Cultivated Commercial Annuals Non-Pivot / Non-Irrigated
41. Subsistence Annual Crops
42. Fallow Land & Old Fields (Trees)
43. Fallow Land & Old Fields (Bush)
44. Fallow Land & Old Fields (Grass)
45. Fallow Land & Old Fields (Bare)
46. Fallow Land & Old Fields (Low Shrub)
47. Residential Formal (Tree)
48. Residential Formal (Bush)
49. Residential Formal (low veg / grass)
50. Residential Formal (Bare)
51. Residential Informal (Tree)
52. Residential Informal (Bush)
53. Residential Informal (low veg / grass)
54. Residential Informal (Bare)
55. Village Scattered
56. Village Dense
57. Smallholdings (Tree)
58. Smallholdings (Bush)
59. Smallholdings (low veg / grass)
60. Smallholdings (Bare)
61. Urban Recreational Fields (Tree)
62. Urban Recreational Fields (Bush)
63. Urban Recreational Fields (Grass)
64. Urban Recreational Fields (Bare)
65. Commercial
66. Industrial
67. Roads & Rail (Major Linear)
68. Mines: Surface Infrastructure
69. Mines: Extraction Sites: Open Cast & Quarries combined
70. Mines: Extraction Sites: Salt Mines
71. Mines: Waste (Tailings) & Resource Dumps
72. Land-fills
73. Fallow Land & Old Fields (wetlands)

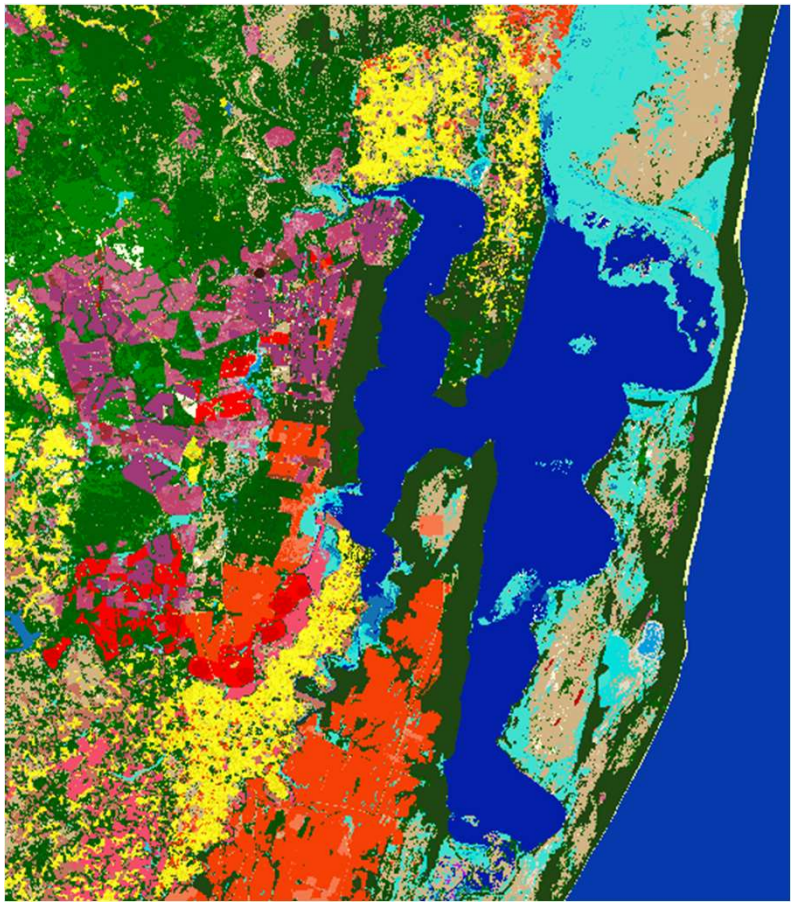


*Gazetted South African Land Cover Classes and definitions approved in terms of the Spatial data Infrastructure Act No. 54 of 2003

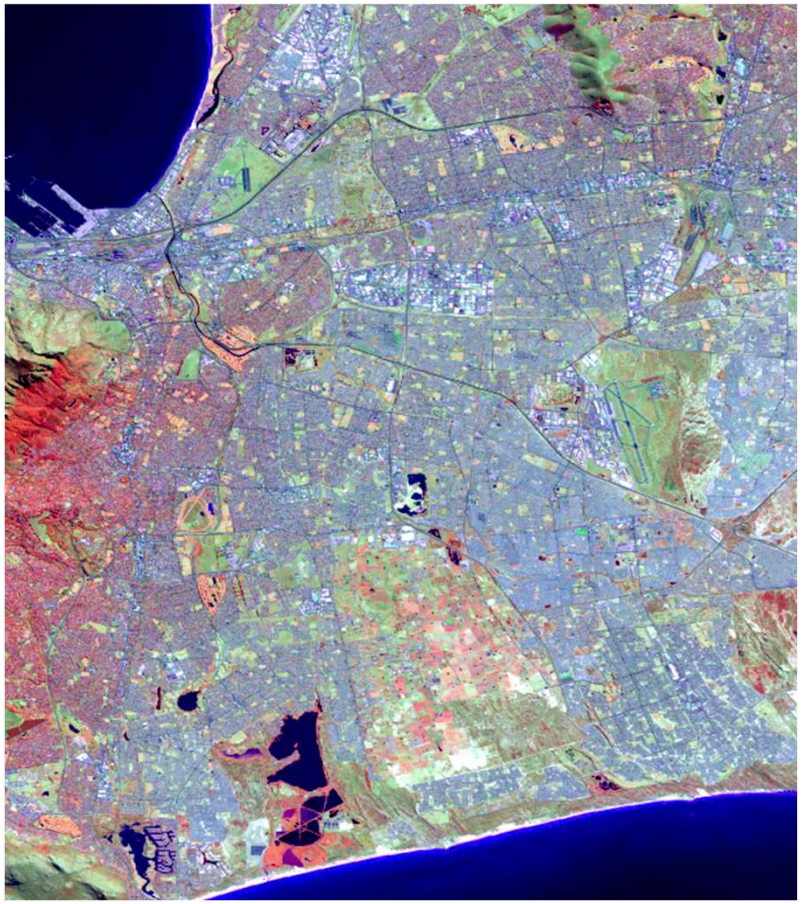
Lake St Lucia **Sentinel 2**



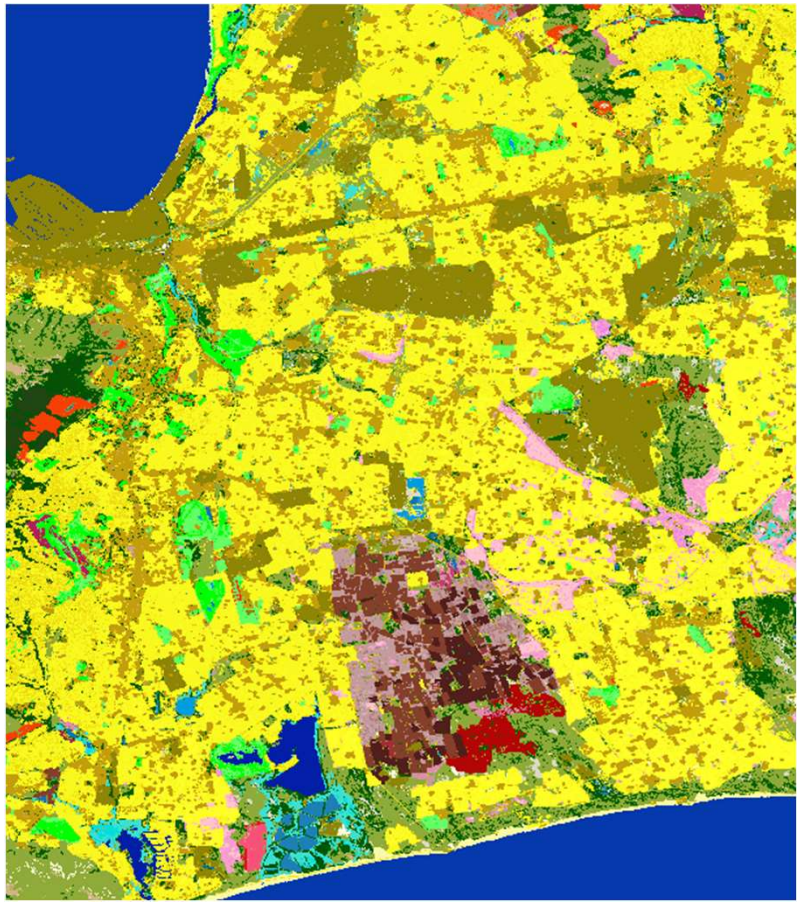
Lake St Lucia **2022 SANLC**



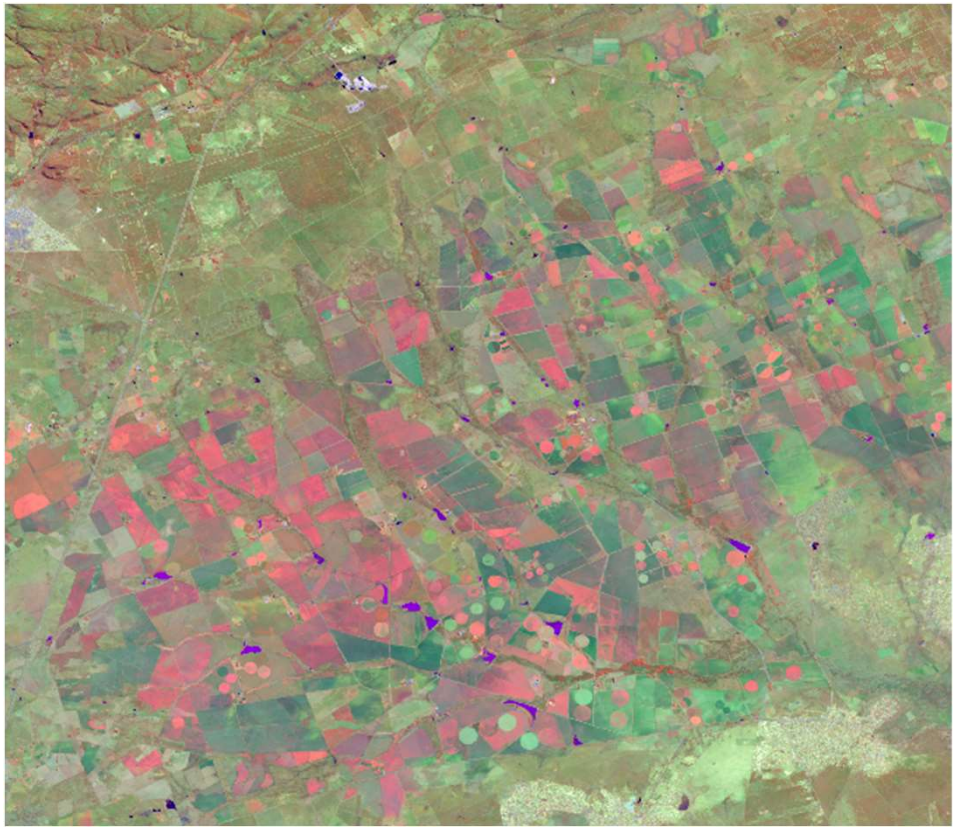
Cape Town Urban **Sentinel 2**



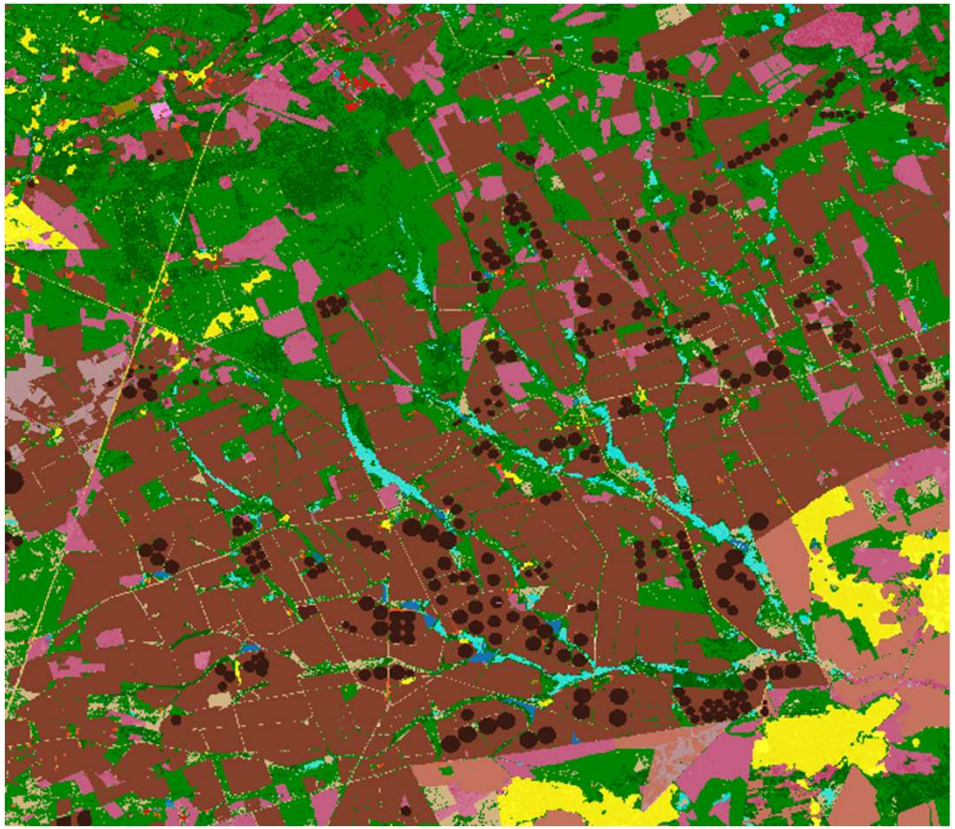
Cape Town Urban **2022 SANLC**



Agricultural fields Limpopo **Sentinel 2**



Agricultural fields Limpopo **2022 SANLC**



Structure of 73 x class legend

Row	Color	SALCC_1	SALCC_2	Class_Names
1		Forested Land	Natural Wooded Land	contiguous (indigenous) forest
2		Forested land	Natural Wooded Land	contiguous low forest & thicket
3		Forested land	Natural Wooded Land	dense forest & woodland
4		Forested land	Natural Wooded Land	open woodland
5		Forested land	Planted Forest	contiguous & dense plantation forest
6		Forested land	Planted Forest	open & sparse plantation forest
7		Forested land	Planted Forest	temporary unplanted (clear-felled) plantation forest
8		Shrubland	Shrubs	low shrubland (other)
9		Shrubland	Karoo & Fynbos Shubland	low shrubland (fynbos)
10		Shrubland	Karoo & Fynbos Shubland	low shrubland (succulent karoo)
11		Shrubland	Karoo & Fynbos Shubland	low shrubland (nama karoo)
12		Grassland	Natural Grassland	sparsely wooded grassland
13		Grassland	Natural Grassland	natural grassland
14		Waterbodies	Natural Waterbodies	natural rivers
15		Waterbodies	Natural Waterbodies	natural estuaries & lagoons
16		Waterbodies	Natural Waterbodies	natural ocean & coastal
17		Waterbodies	Natural Waterbodies	natural lakes
18		Waterbodies	Natural Waterbodies	natural pans (flooded @ observation times)
19		Waterbodies	Artificial Waterbodies	artificial dams (including canals)
20		Waterbodies	Artificial Waterbodies	artificial sewage ponds
21		Waterbodies	Artificial Waterbodies	artificial flooded mine pits
22		Wetlands	Herbaceous Wetlands	herbaceous wetlands (currently mapped)
23		Wetlands	Herbaceous Wetlands	herbaceous wetlands (previously mapped)
24		Wetlands	Woody Wetlands	mangrove wetlands
25		Barren Land	Consolidated	natural rock surfaces
26		Barren Land	Consolidated	dry pans
27		Barren Land	Unconsolidated	eroded lands
28		Barren Land	Unconsolidated	sand dunes (terrestrial)
29		Barren Land	Unconsolidated	coastal sand & dunes
30		Barren Land	Unconsolidated	bare riverbed material
31		Barren Land	Unconsolidated	other bare

***Hierarchical structure**, based on SA Standard (SDI Act No.54 of 2003)*

SALCC-1:
SA Land Cover Classification Level 1

SALCC-2:
SA Land Cover Classification Level 2

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31		Barren Land	Unconsolidated	other bare

***Hierarchical structure**, based on SA Standard (SDI Act No.54 of 2003)*

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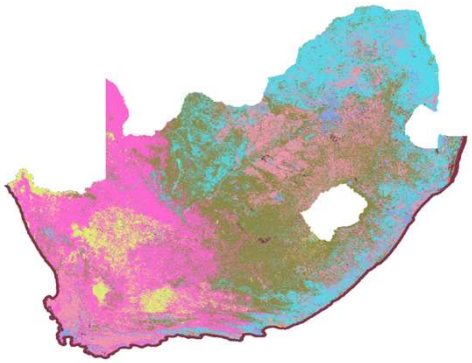
SA Land Cover Classification Level 1

SALCC-2:
SA Land Cover Classification Level 2

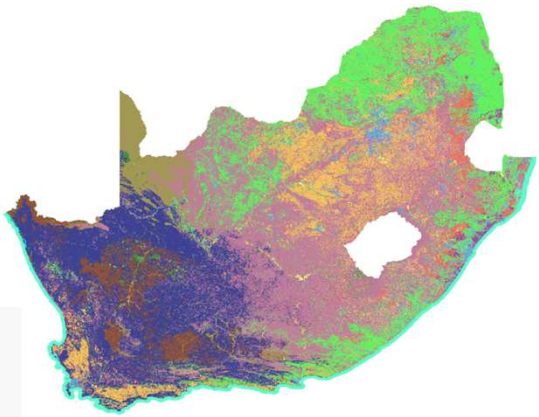
Class Names:
Full 73 x legend Content

Land Cover Classification Level 1



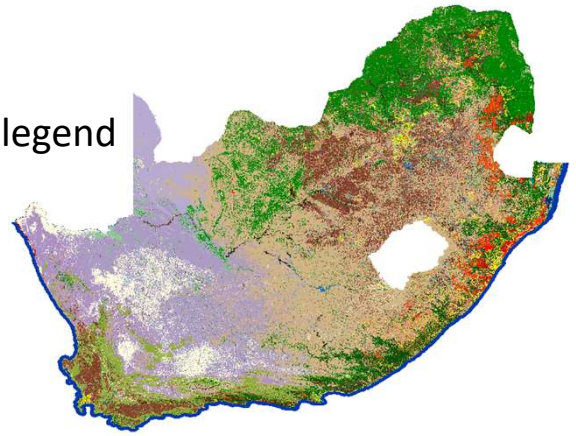
- Barren Land
- Built-up
- Cultivated
- Forested land
- Forested Land
- Grassland
- Mines & Quarries
- Shrubland
- Waterbodies
- Wetlands

Land Cover Classification Level 2



- Artificial Waterbodies
- Commercial
- Consolidated
- Extraction Sites
- Fallow Lands & Old Fields
- Herbaceous Wetlands
- Industrial
- Karoo & Fynbos Shubland
- Natural Grassland
- Natural Waterbodies
- Natural Wooded Land
- Permanent Crops
- Planted Forest
- Residential
- Shrubs
- Smallholdings
- Surface Infrastructure
- Temporary Crops
- Transport
- Unconsolidated
- Urban Vegetation
- Village
- Waste & Resource Dumps
- Woody Wetlands

Full 73 Class legend Content



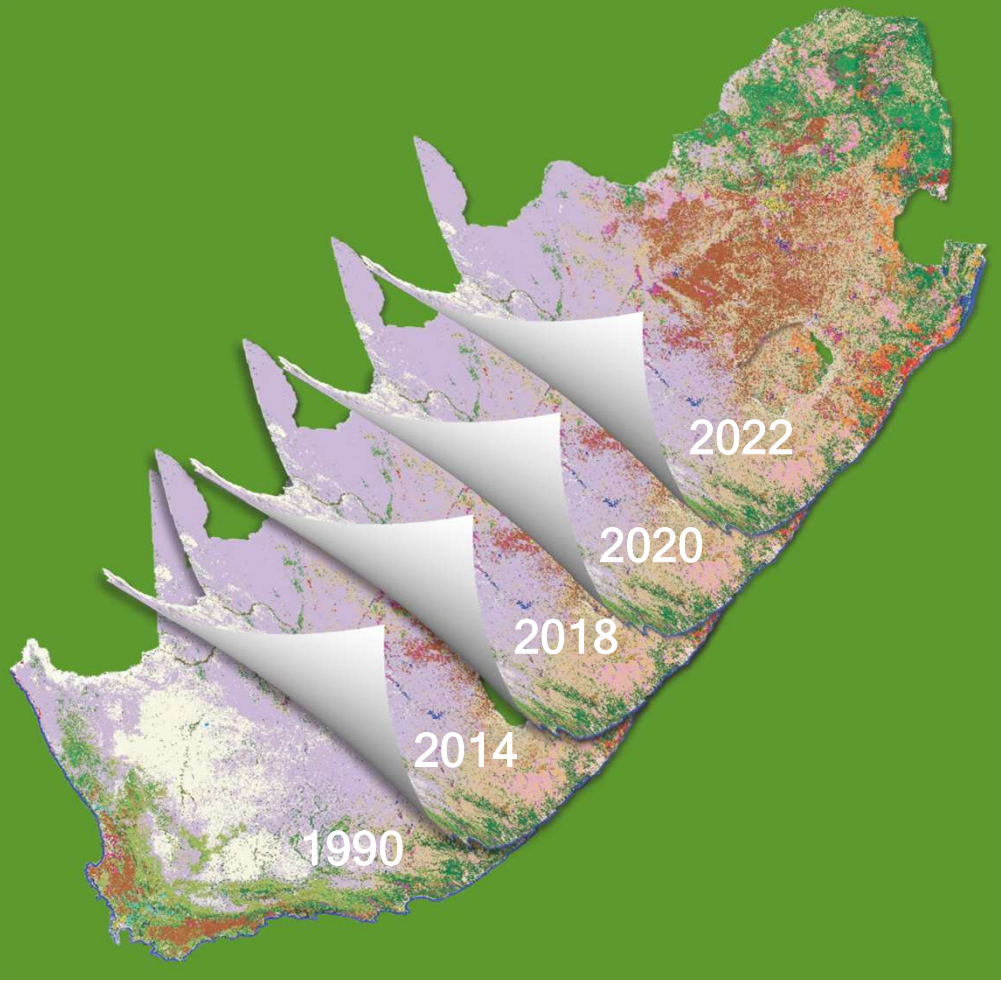
Row	Color	Class_Names
1		contiguous (indigenous) forest
2		contiguous low forest & thicket
3		dense forest & woodland
4		open woodland
5		contiguous & dense plantation forest
6		open & sparse plantation forest
7		temporary unplanted (clear-felled) plantation forest
8		low shrubland (other)
9		low shrubland (fynbos)
10		low shrubland (succulent karoo)
11		low shrubland (nama karoo)
12		sparsely wooded grassland
13		natural grassland
14		natural rivers
15		natural estuaries & lagoons
16		natural ocean & coastal
17		natural lakes
18		natural pans (flooded @ observation times)
19		artificial dams (including canals)
20		artificial sewage ponds
21		artificial flooded mine pits
22		herbaceous wetlands (currently mapped)
23		herbaceous wetlands (previously mapped)
24		mangrove wetlands
25		natural rock surfaces
26		dry pans
27		eroded lands
28		sand dunes (terrestrial)
29		coastal sand & dunes
30		bare riverbed material
31		other bare
32		cultivated commercial permanent orchards
33		cultivated commercial permanent vines
34		cultivated commercial sugarcane pivot irrigated
35		cultivated commercial permanent pineapples
36		cultivated commercial sugarcane non-pivot
37		cultivated emerging farmer sugarcane non-pivot
38		commercial annual crops pivot irrigated

Row	Color	Class_Names
40		commercial annual crops rain-fed / dryland
41		subsistence / small-scale annual crops
42		fallow land & old fields (trees)
43		fallow land & old fields (bush)
44		fallow land & old fields (grass)
45		fallow land & old fields (bare)
46		fallow land & old fields (low shrub)
47		residential formal (tree)
48		residential formal (bush)
49		residential formal (low veg / grass)
50		residential formal (bare)
51		residential informal (tree)
52		residential informal (bush)
53		residential informal (low veg / grass)
54		residential informal (bare)
55		village scattered (bare & low veg/ grss combo)
56		village dense (bare & low veg / grss combo)
57		smallholdings (tree)
58		smallholdings (bush)
59		smallholdings (low veg / grass)
60		smallholdings (bare)
61		urban recreational fields (tree)
62		urban recreational fields (bush)
63		urban recreational fields (grass)
64		urban recreational fields (bare)
65		commercial
66		industrial
67		roads & rails (major linear)
68		mines: surface infrastructure
69		mines: extraction pits, quarries
70		mines: salt mines
71		mine: tailings and resource dumps
72		land-fills
73		fallow land & old fields (wetlands)

2022 SANLC Map Accuracy Statistics

- **Overall Map Accuracy** 84.22 %
- Mean Class Accuracy 83.55 %
- 90 % confidence limits 83.67 – 84.77 %
- **Kappa Index** 83.81
- Number of information classes used in Accuracy Assessment: 47
- Number of sample sites used in Accuracy Assessment: 7498
- Number of information classes in full legend: 73

Change Datasets



For Clarity and Simplicity 20 Aggregated Classes are used for change detection

1. Indigenous Forest (1)*
2. Thicket / dense Bush (2)
3. Natural Wooded Land (3,4,42,43)
4. Planted Forest (5,6,7)
5. Shrubland (8,9,10,11,46)
6. Grasslands (12,13,44)
7. Waterbodies (14-21)
8. Wetlands (22,23,24,73)
9. Barren Land (25,26,28,29,30,31,45)
10. Eroded Lands (27)
11. Cultivated Commercial Permanent Orchards (32,35)
12. Cultivated Commercial Permanent Vines (33)
13. Commercial Annuals Pivot Irrigated (34,38)
14. Commercial Annuals Non-Pivot (36,37,39,40)
15. Cultivated Subsistence (41)
16. Built-up Residential All (47-56,61-64)
17. Built-up Smallholdings (57-60)
18. Built-up Commercial (65)
19. Built-up Industrial (66)
20. Mines (68-72)

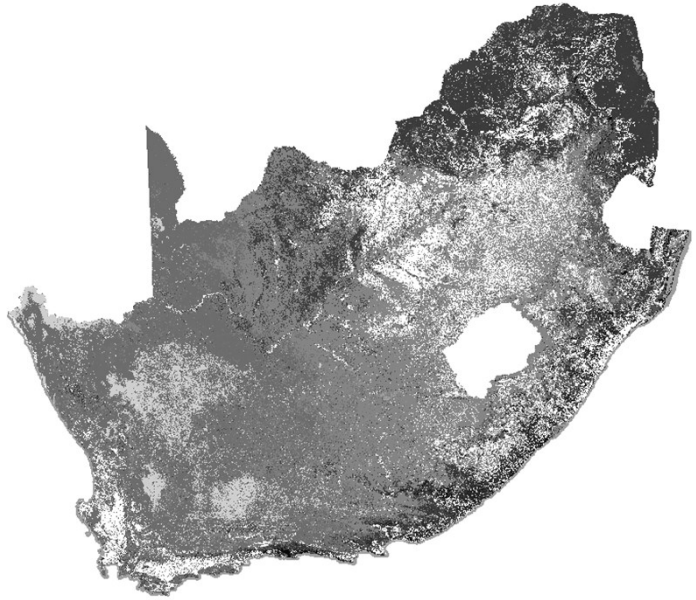
*Numbers in brackets reflect the number assigned to each of the 73 Gazetted land-cover classes

Understanding the Change Codes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	Indigenous Forest (1)	Thicket / dense Bush (2)	Natural Wooded Land (3,4, 42, 43)	Planted Forest (5,6,7)	Shrubland (8,9,10,11,46)	Grasslands (12,13, 44)	Waterbodies (14 – 21)	Wetlands (22,23,24, 73)	Barren Land (25,26,28,29,30,31,45)	Eroded Lands (27)	Cultivated Commercial Permanent Orchards (32, 35)	Cultivated Commercial Permanent Vines (33)	Commercial Annuals Pivot Irrigated (34, 38)	Commercial Annuals Non-Pivot (36, 37, 39, 40)	Cultivated Subsistence (41)	Built-up Residential All (47 - 56, 61 - 64)	Built-up Smallholdings (57 - 60)	Built-up Commercial (65)	Built-up Industrial (66)	Mines (68 – 72)	1990 / 2014
2018																					
1	Indigenous Forest (1)	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
2	Thicket / dense Bush (2)	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
3	Natural Wooded Land (3,4, 42, 43)	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
4	Planted Forest (5,6,7)	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
5	Shrubland (8,9,10,11,46)	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
6	Grasslands (12,13, 44)	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
7	Waterbodies (14 – 21)	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
8	Wetlands (22,23,24, 73)	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
9	Barren Land (25,26,28,29,30,31,45)	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
10	Eroded Lands (27)	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
11	Cultivated Commercial Permanent Orchards (32, 35)	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
12	Cultivated Commercial Permanent Vines (33)	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
13	Commercial Annuals Pivot Irrigated (34, 38)	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280
14	Commercial Annuals Non-Pivot (36, 37, 39, 40)	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
15	Cultivated Subsistence (41)	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320
16	Built-up Residential All (47 - 56, 61 - 64)	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340
17	Built-up Smallholdings (57 - 60)	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360
18	Built-up Commercial (65)	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380
19	Built-up Industrial (66)	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
20	Mines (68 – 72)	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420

With a 20 class change assessment legend, there are 400 possible class-to-class change pairs (i.e. 20 x 20).

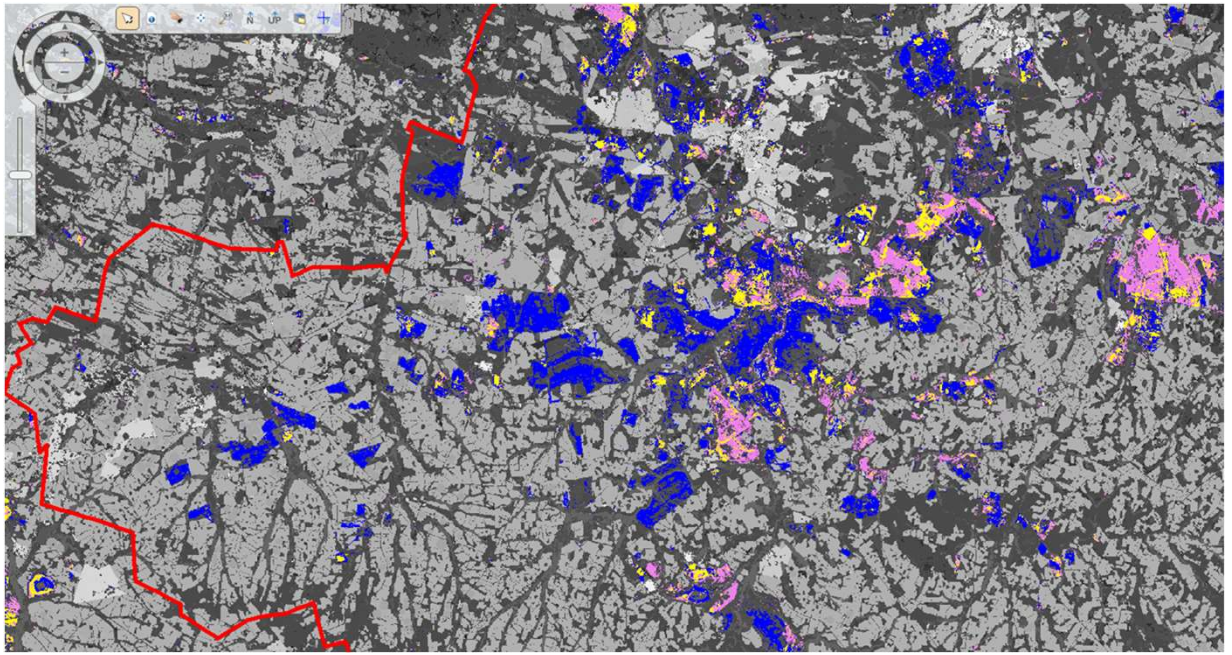
These 400 change outcomes are all allocated a unique code:



Identifying a specific change from the matrix

The unique codes in the change matrix can be used to extract information about a specific change occurrence, e.g. mines-only change:

NEW YEAR \ OLD YEAR	1 Indigenous Forest (1)	2 Thicket / dense Bush (2)	3 Natural Wooded Land (3,4, 42, 43)	4 Planted Forest (5,6,7)	5 Shrubland (8,9,10,11,46)	6 Grasslands (12,13, 44)	7 Waterbodies (14 – 21)	8 Wetlands (22,23,24, 73)	9 Barren Land (25,26,28,29,30,31,45)	10 Eroded Lands (27)	11 Cultivated Commercial Permanent Orchards (32, 35)	12 Cultivated Commercial Permanent Vines (33)	13 Commercial Annuals Pivot Irrigated (34, 38)	14 Commercial Annuals Non-Pivot (36, 37, 39, 40)	15 Cultivated Subsistence (41)	16 Built-up Residential All (47 - 56, 61 - 64)	17 Built-up Smallholdings (57 - 60)	18 Built-up Commercial (65)	19 Built-up Industrial (66)	20 Mines (68 – 72)	OLD YEAR
1 Indigenous Forest (1)	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
2 Thicket / dense Bush (2)	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	
3 Natural Wooded Land (3,4, 42, 43)	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	
4 Planted Forest (5,6,7)	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	
5 Shrubland (8,9,10,11,46)	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	
6 Grasslands (12,13, 44)	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	
7 Waterbodies (14 – 21)	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	
8 Wetlands (22,23,24, 73)	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	
9 Barren Land (25,26,28,29,30,31,45)	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	
10 Eroded Lands (27)	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	
11 Cultivated Commercial Permanent Orchards (32, 35)	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	
12 Cultivated Commercial Permanent Vines (33)	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	
13 Commercial Annuals Pivot Irrigated (34, 38)	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	
14 Commercial Annuals Non-Pivot (36, 37, 39, 40)	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	
15 Cultivated Subsistence (41)	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	
16 Built-up Residential All (47 - 56, 61 - 64)	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	
17 Built-up Smallholdings (57 - 60)	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	
18 Built-up Commercial (65)	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	
19 Built-up Industrial (66)	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	
20 Mines (68 – 72)	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	



Mines only in new year

Mines in both old & new years

Mines only in old year

The National Land-Cover Change Matrix

The 20 aggregated land-cover classes used in land-cover change analysis

The figures in the matrix represent hectares (ha) of a particular land-cover class in a given year

The row totals provide the total 2020 hectares of the row land-cover class

Area in hectares

1990 National	Indigenous Forest (1)	Thicket / dense Bush (2)	Natural Wooded Land (3,4,42,43)	Planted Forest (5,6,7)	Shrubland (8,9,10,11,46)	Grasslands (12,13,44)	Waterbodies (14-21	ands (2 73)	Barren (25,26,28,29 5)	Eroded Lands (27)	Cultivated Commercial Permanent Orchards (32,35)	Cultivated Commercial Permanent Vines (33)	Commercial Annuals Pivot Irrigated (34,38)	Commercial Annuals Non-Pivot (36,37,39,40)	Cultivated Subsistence (41)	Built-up Residential All (47-56,61-64)	Built-up Smallholdings (57-60)	Built-up Commercial (65)	Built-up Industrial (66)	Mines (68-72)	Total 2020 Areas
2020 National	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Indigenous Forest (1)	320995	1938	12878	43615	9168	27426	639	9263	1005	0	108	0	0	1110	217	4151	235	63	33	28	**432870**
Thicket / dense Bush (2)	77011	717614	76761	61723	75178	172673	3882	32050	3209	26	3486	430	282	12964	5835	11845	868	375	424	112	**1256748**
Natural Wooded Land (3,4,42,43)	35953	3359080	6941931	65528	2247786	4700107	24206	176903	52834	25584	22723	3933	10106	388618	250645	65232	6560	3818	3300	18491	**18403339**
Planted Forest (5,6,7)	3088	45707	49218	1470628	22180	396790	1628	22625	651	110	1946	302	151	39287	1611	6458	1459	61	123	2617	**2066640**
Shrubland (8,9,10,11,46)	1047	364993	920259	27265	24006745	1357161	31435	85701	4577212	134471	9449	9932	2480	185128	961	2857	397	202	436	19217	**31737345**
Grasslands (12,13,44)	18379	1530541	2252783	140478	11273439	18773041	55012	481293	174598	94518	10458	1580	8601	836610	132054	63061	4414	6373	9192	91589	**35958011**
Waterbodies (14-21)	233	21576	18697	2123	20759	48445	1940924	31221	35052	759	232	131	83	6238	1220	1037	322	38	82	4534	**2133706**
Wetlands (22,23,24,73)	822	63843	34771	17197	32024	274920	21719	562127	4460	1698	674	329	341	29298	1943	4462	982	153	274	2230	**1054268**
Barren Land (25,26,28,29,30,31,45)	993	118274	267187	4135	2841472	518027	105693	29614	8624180	9623	1175	700	262	17715	10228	3400	224	204	451	4740	**12558296**
Eroded Lands (27)	42	5759	14067	184	114358	117508	396	4063	5395	169203	11	3	26	967	2644	743	2	2	1	699	**436072**
Cultivated Commercial Permanent Orchards (32,35)	496	21989	11597	7804	12521	9572	294	2419	400	11	189018	10562	6684	43355	684	545	933	4	33	13	**318935**
Cultivated Commercial Permanent Vines (33)	0	2847	1119	323	11167	1359	115	1804	3738	0	1153	114504	775	5001	1	118	492	7	24	3	**144552**
Commercial Annuals Pivot Irrigated (34,38)	19	10719	40137	875	80409	89566	172	7456	2027	336	4813	908	184009	477208	1784	89	616	1	5	145	**901295**
Commercial Annuals Non-Pivot (36,37,39,40)	1249	76898	94278	21824	259593	612350	3329	45683	3095	580	57658	15762	24588	9314940	32572	4770	14430	32	138	1204	**10584973**
Cultivated Subsistence (41)	2245	34089	66361	3403	62703	136747	939	15473	295	4754	4248	0	980	21527	1511336	22555	2292	7	3	376	**1890334**
Built-up Residential All (47-56,61-64)	16	92577	118505	32772	106890	364758	940	9929	7663	3119	1930	1019	596	33036	25839	2151734	17258	3949	981	1620	**2976730**
Built-up Smallholdings (57-60)	17	1810	9364	9456	2748	12823	119	327	32	153	68	72	5	9554	256	3161	191593	67	133	60	**241805**
Built-up Commercial (65)	1	2629	1565	748	3664	6329	73	332	300	10	66	94	23	967	88	3	1277	28456	1377	129	**80666**
Built-up Industrial (66)	5	3983	3190	794	10839	11542	957	540	3535	47	2249	231	765	6697	104	93	1103	554	39218	1377	**97044**
Mines (68-72)	3	10120	14908	4355	25988	46421	4001	1773	10153	648	34	39	452	33529	2107	344	239	241	2198	128053	**289222**
Total 1990 Areas		6486986	10949573	1915227	41219629	27677564	2196473	1520598	13589835	445652	311501	169532	241208	11463749	1982130	2391479		44697	58425	277237	

The individual numbers provide the hectares of the 1990 land class that were converted to the corresponding 2020 class. In this example, 2245 ha of Indigenous Forest was converted to Cultivated Subsistence from 1990 to 2020

The column totals provide the total 1990 hectares of the column land-cover class

The 1990/2020 class intercept provides the 'unchanged' hectares of that land-cover class

Provincial Change Matrices

Area in hectares

1990 Western Cape		Indigenous Forest (1)	Thicket / dense Bush (2)	Natural Wooded Land (3,4,42,43)	Planted Forest (5,6,7)	Shrubland (8,9,10,11,46)	Grasslands (12,13,44)	Waterbodies (14-21)	Wetlands (22,23,24,73)	Barren Land (25,26,28,29,30,31,45)	Eroded Lands (27)	Cultivated Commercial Permanent Orchards (32,35)	Cultivated Commercial Permanent Vines (33)	Commercial Annuals Pivot Irrigated (34,38)	Commercial Annuals Non-Pivot (36,37,39,40)	Cultivated Subsistence (41)	Built-up Residential All (47-56,61-64)	Built-up Smallholdings (57-60)	Built-up Commercial (65)	Built-up Industrial (66)	Mines (68-72)
2022 Western Cape		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Indigenous Forest (1)	1	46788	30	916	9309	1764	1007	12	381	16	0	3	0	0	280	0	58	70	3	4	0
Thicket / dense Bush (2)	2	8923	33106	2582	5087	45818	7119	329	8618	153	0	796	413	20	2263	5	536	122	75	89	4
Natural Wooded Land (3,4,42,43)	3	3049	112853	41439	5514	242887	42784	1626	18172	11255	103	2292	2296	175	12269	81	1156	176	301	271	65
Planted Forest (5,6,7)	4	431	2468	1762	67634	10359	1961	90	771	43	0	382	301	4	1778	1	56	102	5	8	9
Shrubland (8,9,10,11,46)	5	546	157518	218504	21839	4367186	435760	7637	32816	1395431	9716	8674	9397	1896	165449	223	1198	270	135	333	1770
Grasslands (12,13,44)	6	203	224184	84070	1146	797500	120977	1409	7576	118224	1663	594	1498	285	16630	44	336	12	114	129	204
Waterbodies (14-21)	7	12	1667	1216	531	6780	1569	37793	2726	4176	10	81	114	6	538	0	149	33	9	13	175
Wetlands (22,23,24,73)	8	20	4448	982	656	13019	2086	3248	49913	688	19	271	329	18	2666	1	118	26	21	27	14
Barren Land (25,26,28,29,30,31,45)	9	15	20451	45941	517	410988	52644	3338	5485	1179314	273	963	628	172	6079	35	216	6	48	67	162
Eroded Lands (27)	10	0	857	363	1	6588	286	3	36	460	10155	0	4	2	92	0	1	0	0	0	44
Cultivated Commercial Permanent Orchards (32,35)	11	7	2605	181	552	7630	977	84	1066	95	5	52319	3266	639	7556	0	22	141	2	9	2
Cultivated Commercial Permanent Vines (33)	12	0	1592	743	317	7018	1066	86	1029	39	0	1122	89068	654	4397	1	109	333	7	23	3
Commercial Annuals Pivot Irrigated (34,38)	13	17	685	204	87	18187	2144	15	435	286	8	314	443	12519	44702	0	0	8	0	1	2
Commercial Annuals Non-Pivot (36,37,39,40)	14	483	9214	4037	3307	139591	23948	471	11489	994	104	35926	15405	2167	1401501	543	108	1529	5	36	60
Cultivated Subsistence (41)	15	0	5	6	0	25	1	0	47	0	0	0	0	0	62	79	3	18	0	0	0
Built-up Residential All (47-56,61-64)	16	147	8198	1188	2366	28738	3888	252	1489	1076	2	360	1011	22	2147	7	64280	582	732	197	30
Built-up Smallholdings (57-60)	17	4	153	4	193	404	48	13	32	1	0	18	71	0	30	0	37	6505	4	6	1
Built-up Commercial (65)	18	1	546	41	150	2097	266	26	210	30	0	8	59	0	111	0	7740	67	5320	264	4
Built-up Industrial (66)	19	3	698	132	132	5138	823	129	332	434	0	1059	1141	14	1287	0	862	143	142	6945	73
Mines (68-72)	20	1	437	204	35	4373	872	152	74	354	13	4	9	4	900	0	8	7	0	34	2612

1. National | 2. Limpopo | 3. Mpumalanga | 4. Gauteng | 5. Free State | 6. KwaZulu-Natal | 7. North West | 8. Eastern Cape | 9. Northern Cape | **10. Western Cape** | 11. Change summary

Time Series of Change Assessment

1990-2022

2014-2022

2018-2022

2020-2022

1990-2020

2014-2020

2018-2020

1990-2018

2014-2018

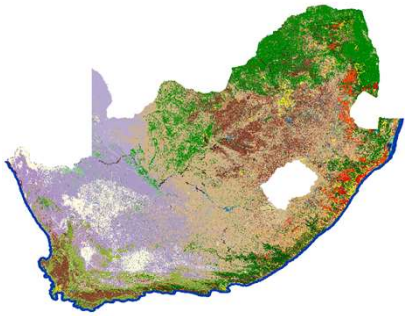
1990-2014

Access Platforms

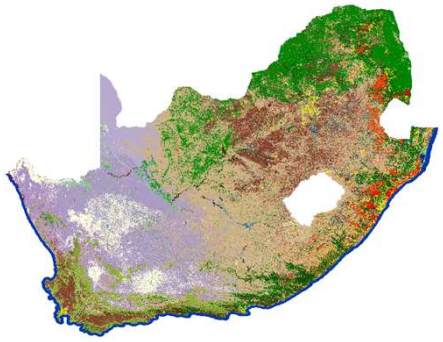
https://egis.environment.gov.za/gis_data_downloads

South African National Land Cover (SANLC) 2022

NAME OF DATA SET	RELEASE DATE	FILE FORMAT	SIZE
• ACCURACY ASSESSMENT REPORT (REPORT)	23 May 2024	zip	1,44KB
• ALBERS (DATASET)	23 May 2024	Zip	404MB
• GEOGRAPHIC (DATASET)	23 May 2024	Zip	445MB
• LEVEL 1 & LEVEL 2 COLOUR PALLET (REPORT & LAYER FILE)	23 May 2024	Zip	1,4KB



SA_NLC_2022_ALBERS.tif



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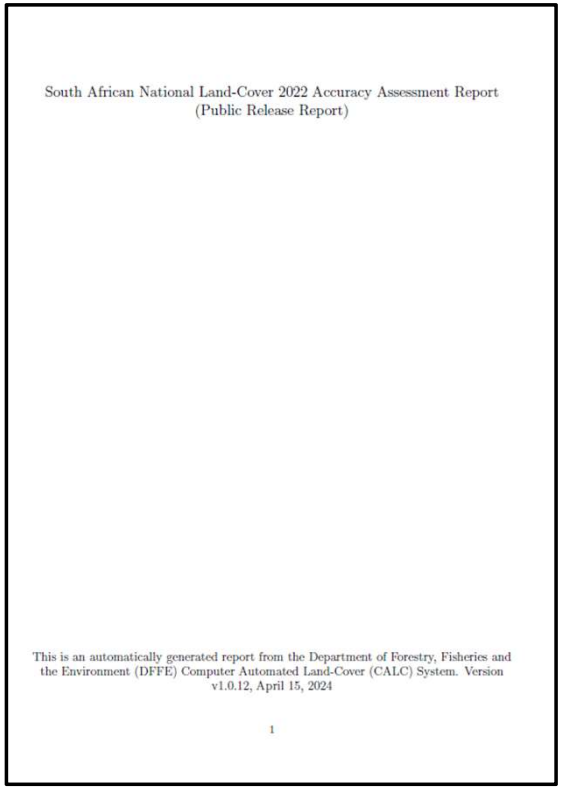


South African National Land-Cover 2022 Accuracy Assessment Report
(Public Release Report)

This is an automatically generated report from the Department of Forestry, Fisheries and the Environment (DFFE) Computer Automated Land-Cover (CALC) System. Version v1.0.12, April 15, 2024

1

SANLC 2022 Accuracy Assessment Report

Access Platforms

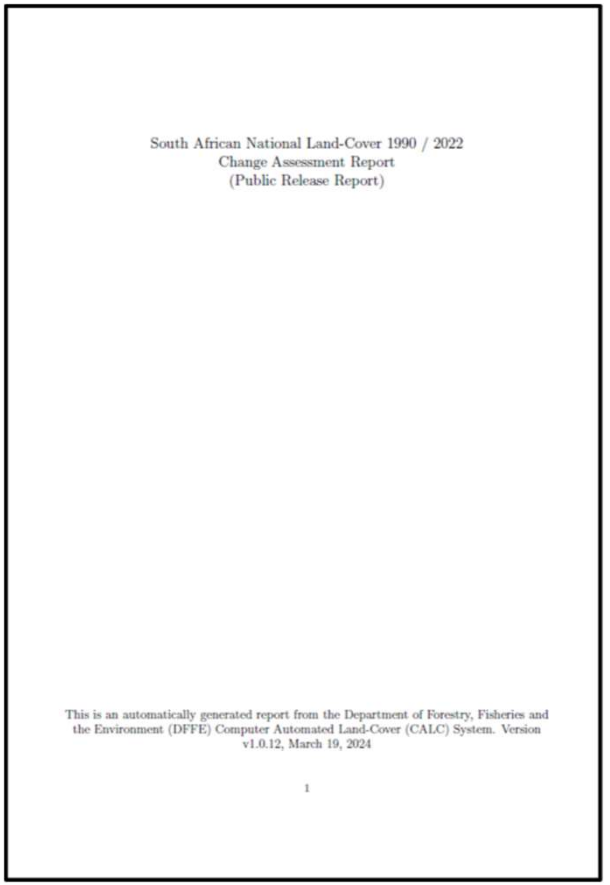
https://egis.environment.gov.za/gis_data_downloads

South African National Land Cover (SANLC) Change Assessment Datasets

Please note that Gauteng and the North-West provincial boundaries were corrected for all the change assessment years. The previous change assessments used an older provincial boundary, which has now been corrected.

Date Updated: **23 May 2024**

NAME OF DATA SET	RELEASE DATE	FILE FORMAT	SIZE
• SA_NLC_1990_2022_CLASS_CHANGE (DATASET AND REPORT)	23 May 2024	Zip	MB
• SA_NLC_2014_2022_CLASS_CHANGE (DATASET AND REPORT)	23 May 2024	Zip	MB
• SA_NLC_2018_2022_CLASS_CHANGE (DATASET AND REPORT)	23 May 2024	Zip	MB
• SA_NLC_2020_2022_CLASS_CHANGE (DATASET AND REPORT)	23 May 2024	Zip	MB
• SA_NLC_1990_2020_CLASS_CHANGE (DATASET AND REPORT)	23 May 2024	Zip	MB
• SA_NLC_2014_2020_CLASS_CHANGE (DATASET AND REPORT)	23 May 2024	Zip	MB
• SA_NLC_2018_2020_CLASS_CHANGE (DATASET AND REPORT)	23 May 2024	Zip	MB
• SA_NLC_1990_2018_CLASS_CHANGE (DATASET AND REPORT)	23 May 2024	Zip	MB
• SA_NLC_2014_2018_CLASS_CHANGE (DATASET AND REPORT)	23 May 2024	Zip	MB
• SA_NLC_1990_2014_CLASS_CHANGE (DATASET AND REPORT)	23 May 2024	Zip	MB


South African National Land-Cover 1990 / 2022
Change Assessment Report
(Public Release Report)

This is an automatically generated report from the Department of Forestry, Fisheries and the Environment (DFFE) Computer Automated Land-Cover (CALC) System. Version v1.0.12, March 19, 2024

1

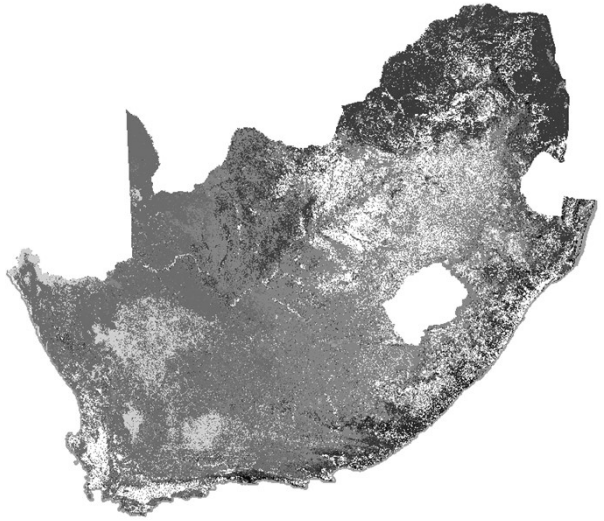
Change Assessment Reports

Access Platforms

https://egis.environment.gov.za/gis_data_downloads

Area in hectares

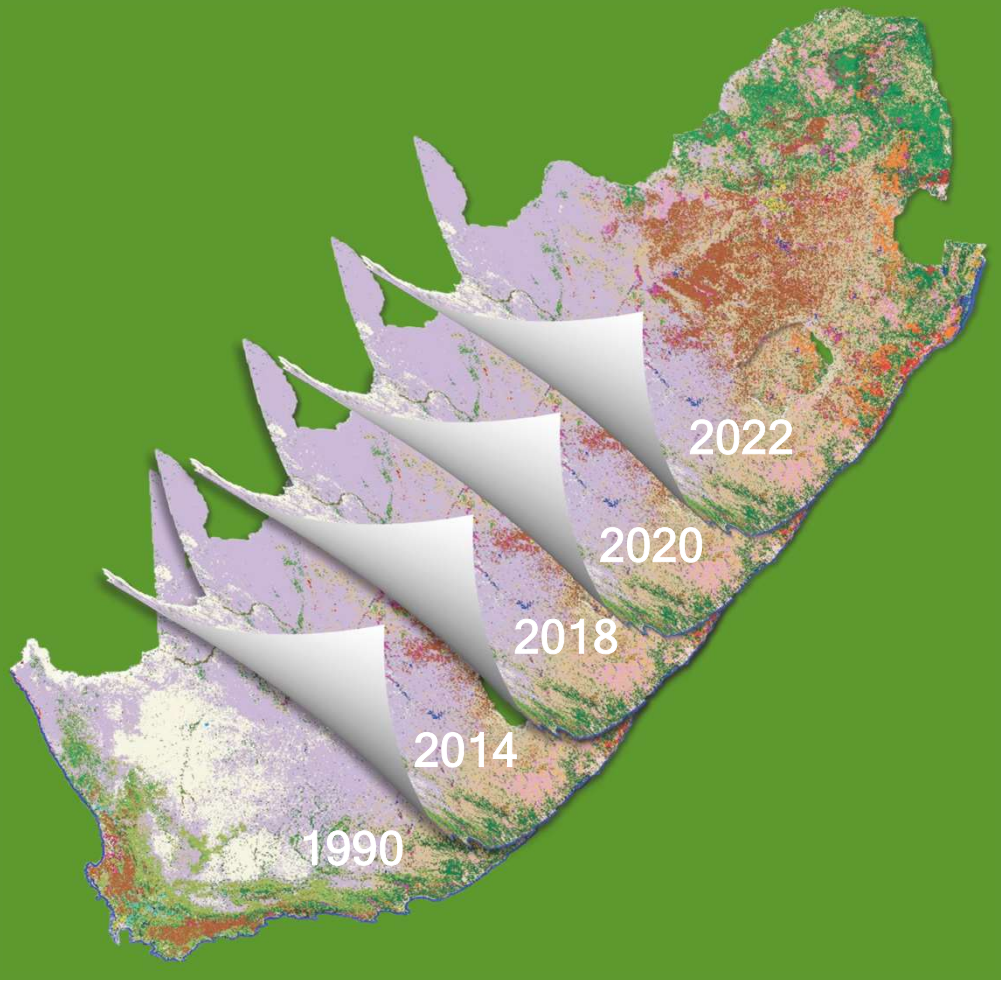
2022 National	1990 National	Indigenous Forest (1)	Thicket / dense Bush (2)	Natural Wooded Land (3,4,42,43)	Planted Forest (5,6,7)	Shrubland (8,9,10,11,46)	Grasslands (12,13,44)	Waterbodies (14-21)	Wetlands (22,23,24,73)	Barren Land (25,26,28,29,30,31,45)	Eroded Lands (27)	Cultivated Commercial Permanent Orchards (32,35)	Cultivated Commercial Permanent Vines (33)	Commercial Annuals Pivot Irrigated (34,38)	Commercial Annuals Non-Pivot (36,37,39,40)	Cultivated Subsistence (41)	Built-up Residential All (47-56,61-64)	Built-up Smallholdings (57-60)	Built-up Commercial (65)	Built-up Industrial (66)	Mines (68-72)
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Indigenous Forest (1)	1	322838	1983	12953	44231	9224	28212	601	9294	991	0	110	0	0	1153	282	4373	234	65	32	29
Thicket / dense Bush (2)	2	86471	1026530	128304	71224	102174	609267	3469	40750	9384	131	3716	546	271	15919	8478	24432	1065	518	698	245
Natural Wooded Land (3,4,42,43)	3	29543	3620139	7583373	65281	4011765	6043645	18078	217514	95407	38126	27630	3947	10574	443132	236472	85858	7895	4550	4169	26422
Planted Forest (5,6,7)	4	3525	51440	52495	1493513	24885	444764	1605	26968	716	134	2059	304	159	42321	1929	7322	1717	66	134	3217
Shrubland (8,9,10,11,46)	5	850	217022	679310	23660	18803840	985801	13723	51211	7673755	102160	9126	9580	2090	181339	783	2123	340	174	418	14781
Grasslands (12,13,44)	6	13587	1141925	1883695	111503	16365093	17530767	31276	453925	877682	148634	4949	1614	8030	778891	102002	51420	3949	6040	8860	102353
Waterbodies (14-21)	7	401	36732	32800	2830	37718	87151	2030278	63690	60866	1221	256	231	213	13241	1833	1358	575	41	85	6615
Wetlands (22,23,24,73)	8	812	63147	33544	16471	32555	275908	14995	553753	4249	1705	687	330	303	29330	1932	4544	992	156	280	2217
Barren Land (25,26,28,29,30,31,45)	9	555	62005	148256	2731	1167131	307134	66695	16113	4751235	6621	1272	712	317	13659	5016	2316	154	180	388	4502
Eroded Lands (27)	10	30	4529	9607	111	77563	58902	173	1619	5022	137043	9	4	8	433	1605	526	1	1	2	792
Cultivated Commercial Permanent Orchards (32,35)	11	497	21731	11110	7874	12608	9225	288	2339	367	11	186564	10228	5881	41952	683	530	892	4	33	8
Cultivated Commercial Permanent Vines (33)	12	0	2659	1091	323	10288	1342	114	1802	2544	0	1139	113776	775	4938	1	117	466	7	23	3
Commercial Annuals Pivot Irrigated (34,38)	13	19	10782	42755	981	84478	93264	166	7696	2070	356	4893	903	184311	483762	2168	89	634	1	5	160
Commercial Annuals Non-Pivot (36,37,39,40)	14	1249	77851	96265	23666	262172	621713	2942	45880	3080	586	57528	15692	24552	9303188	32505	4756	14429	32	136	1268
Cultivated Subsistence (41)	15	2233	36175	75109	3398	65068	133274	848	15642	293	4801	4434	0	944	23315	1551293	22719	2289	7	4	455
Built-up Residential All (47-56,61-64)	16	1557	92541	129560	32158	111607	370180	880	9580	7598	3332	2038	1053	700	34297	32720	2131991	16141	4082	963	1846
Built-up Smallholdings (57-60)	17	6	1802	9365	9399	2619	12841	81	317	30	164	68	72	5	9351	145	3378	191253	68	132	62
Built-up Commercial (65)	18	32	2594	1528	734	3509	6112	70	329	310	10	68	61	10	1004	110	31684	1194	27816	1326	119
Built-up Industrial (66)	19	13	5126	4210	904	12641	12704	964	707	5007	53	4917	1445	1803	10663	154	9030	1276	532	38623	1345
Mines (68-72)	20	535	10007	13643	4176	22692	39356	3228	1488	9230	560	38	35	263	31800	2020	2843	201	208	2114	110797



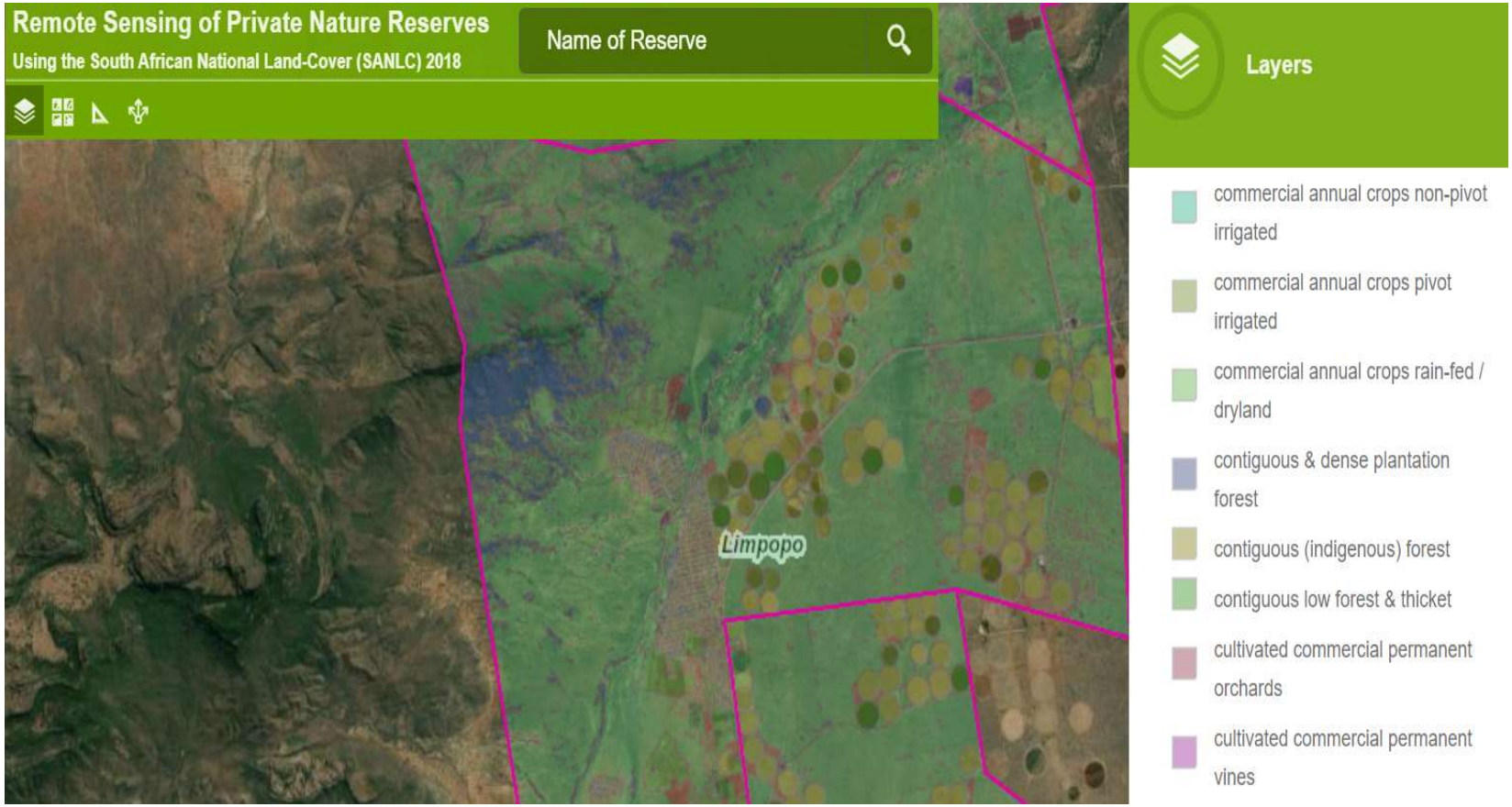
Change assessment tables for each of the assessment years

SA_NLC_1990_2022_CLASS_CHANGE_ALBERS.tif

Land Cover operational use for DFFE



Protected Area Monitoring



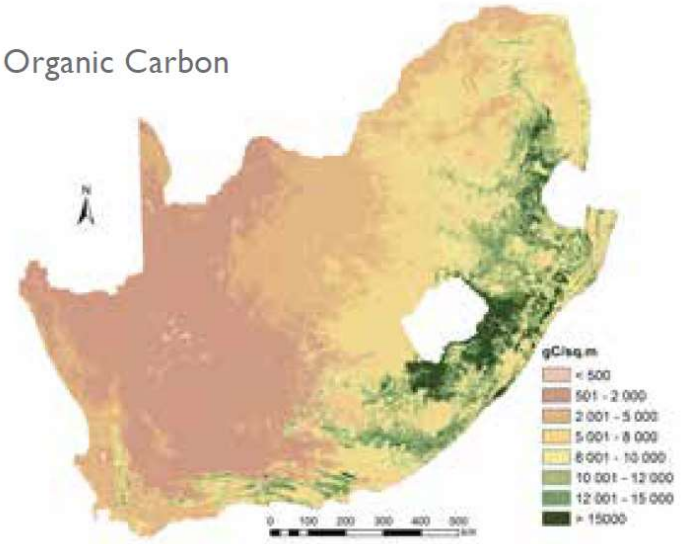
- Screening of Protected Areas
- Compliance and Enforcement Monitoring

Inputs into Carbon Mapping

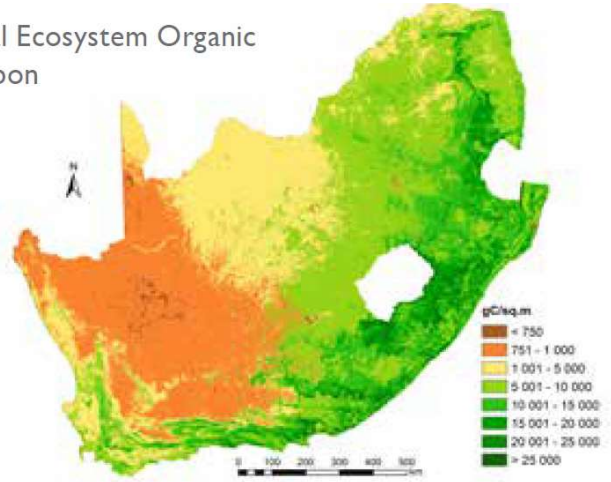
Elements	Reference	1990	2014	2018	Reference - 1990	1990 - 2014	2014 - 2018	Reference - 2018
Province	Total topsoil carbon in Tg				% change			
Northern Cape	537	530	530	527	-1.32	-0.13	-0.58	-2.02
Mpumalanga	407	381	383	374	-6.42	0.66	-2.49	-8.15
KwaZulu-Natal	627	590	585	574	-5.88	-0.96	-1.78	-8.44
Gauteng	66	62	62	60	-7.53	0.24	-2.03	-9.19
Free State	432	382	383	377	-11.74	0.41	-1.53	-12.74
Eastern Cape	830	790	797	781	-4.85	0.78	-1.99	-6.02
Western Cape	436	418	417	413	-4.42	-0.14	-1.03	-5.54
North West	237	216	219	212	-9.11	1.26	-2.97	-10.70
Limpopo	425	409	410	402	-3.97	0.45	-2.11	-5.57
Total	**4 001**	**3 777**	**3 785**	**3 720**	**-5.60**	**0.21**	**-1.73**	**-7.03**

The mean reduction in SOC for the country due to cultivation of cropland soils

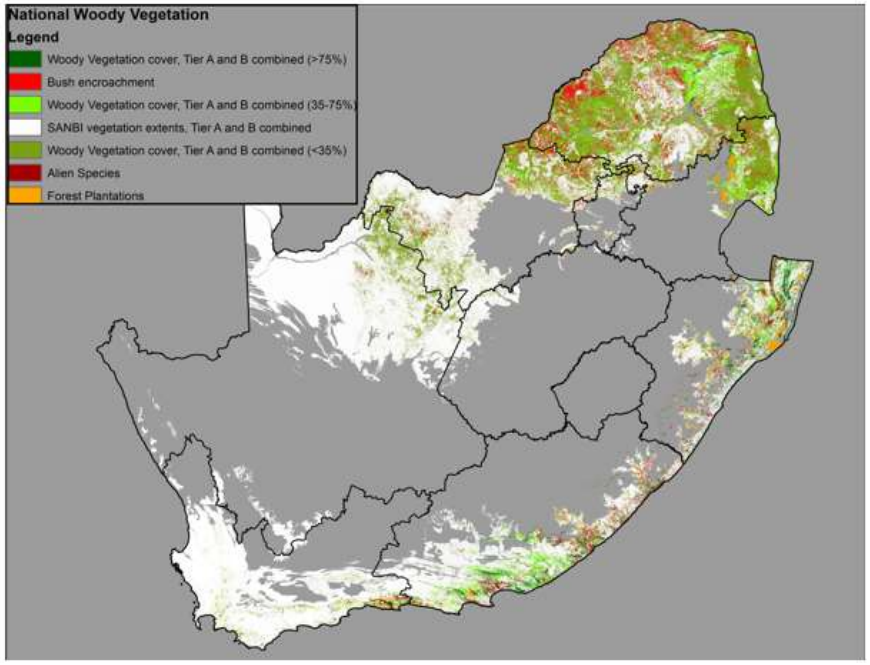
Soil Organic Carbon



Total Ecosystem Organic Carbon



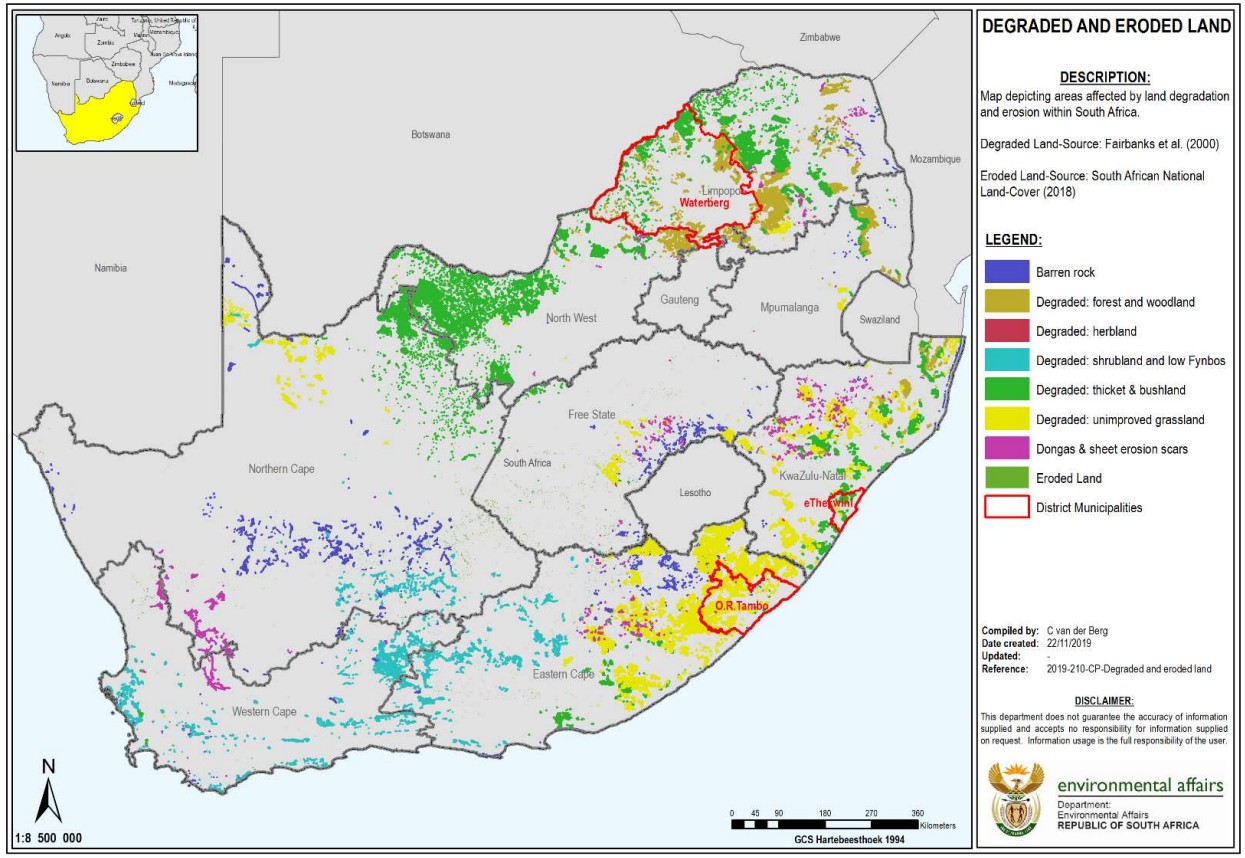
REDD+ Reducing Emissions from Deforestation and Forest Degradation



Identify important hotspots were mitigation actions must be implemented

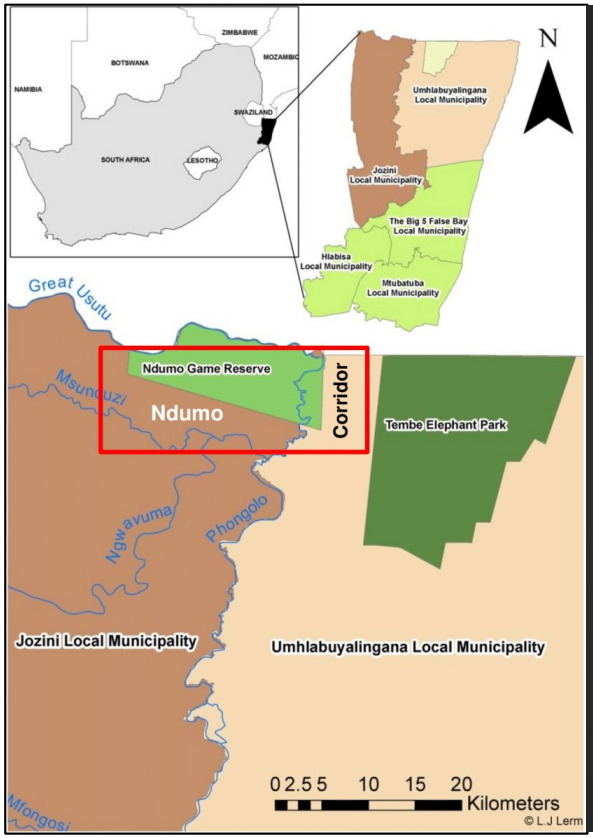
Activity	Spatial extent (ha)	Reduction per unit area per yr (tC)	Emission reduction per yr (tCO2e)	Reduction i emissions ov 20yr (tCO2e
Identified in the Mitigation Potential Analysis (MPA 2014)				
Urban tree planting			26 950	539 0
Expanding plantations			120 900	2 418 0
Identified in the National Terrestrial Carbon Sink Assessment				
Restoration coastal / scarp forests	8 570	1.8	56 562	1 131
Restoration broadleaf woodland	300 000	1.1	1 210 000	24 200
Commercial small-grower afforestation E. Cape	60 000	1.5	330 000	2 750
Commercial small-grower afforestation KZN	40 000	1.5	220 000	1 833
Additional stated in published national policies and plans				
Restoring state forests and woodlands	2 500	1.5	13 750	275
Replanting temporary unplanted plantations	30 000	1.5	165 000	660

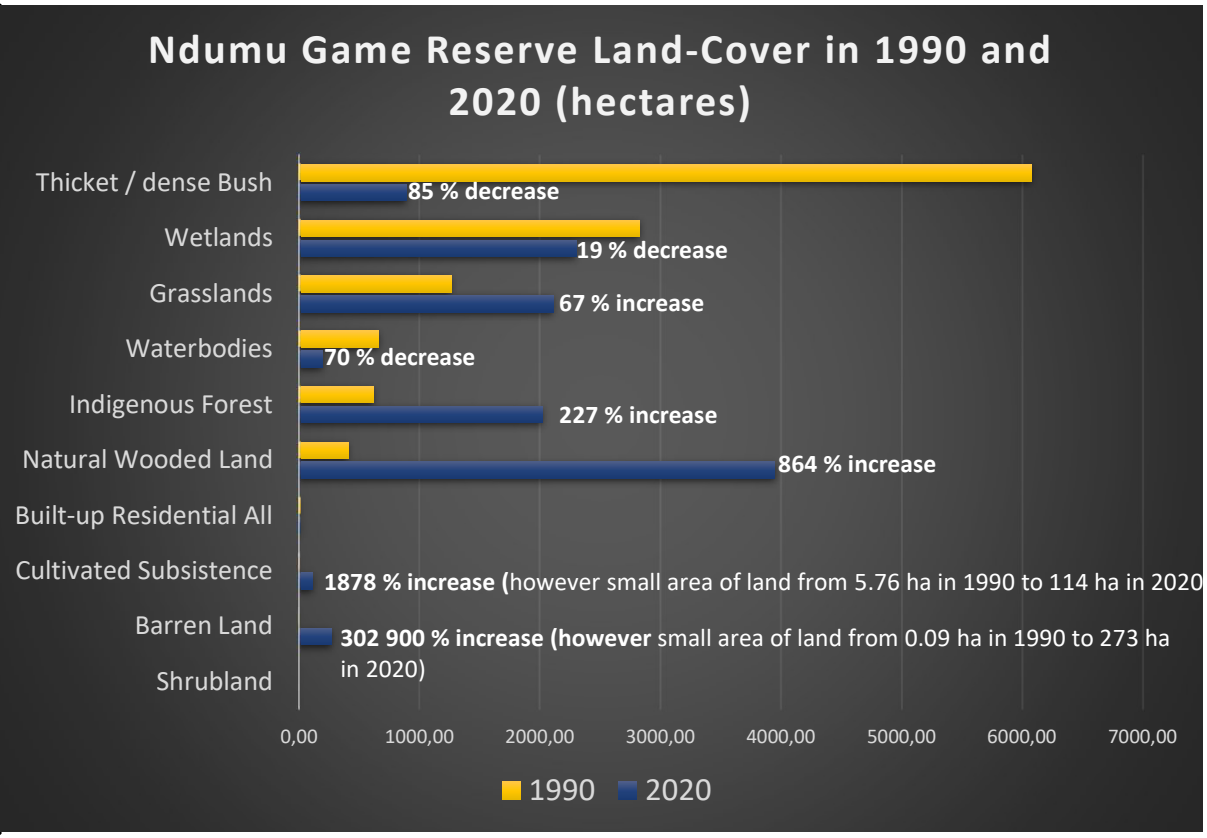
Tracking of erosion

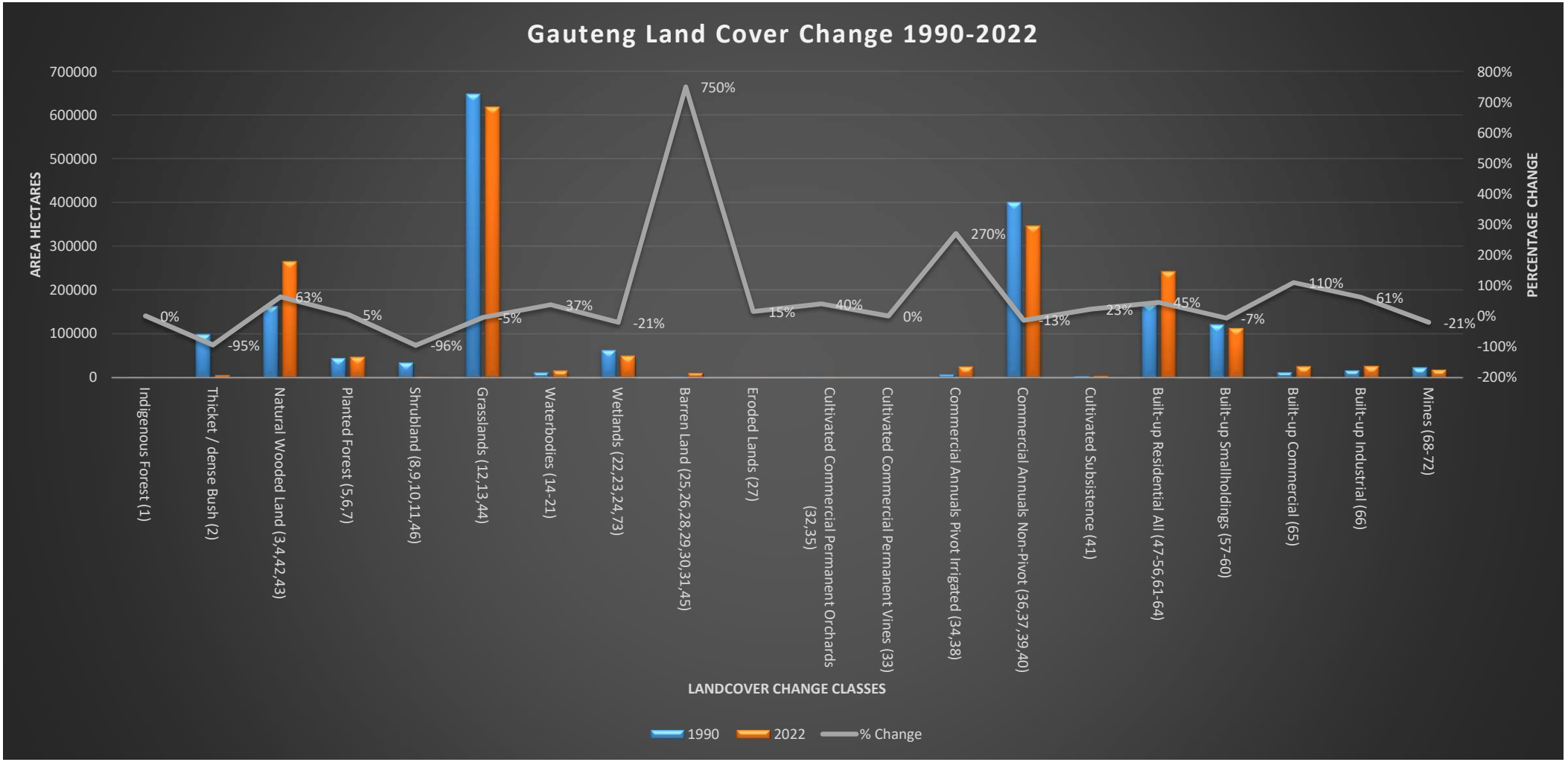


Continuous tracking of **erosion**, **land degradation** and **desertification** especially in grasslands, woodlands and thickets

Ndumu Game Reserve – Radical change






Gauteng Land Cover Change 1990-2022
AREA HECTARES
PERCENTAGE CHANGE
700000
600000
500000
400000
300000
200000
100000
0
800%
700%
600%
500%
400%
300%
200%
100%
0%
-100%
-200%
0%
-95%
63%
5%
-96%
-5%
37%
-21%
750%
15%
40%
0%
270%
-13%
23%
45%
-7%
110%
61%
-21%
Indigenous Forest (1)
Thicket / dense Bush (2)
Natural Wooded Land (3,4,42,43)
Planted Forest (5,6,7)
Shrubland (8,9,10,11,46)
Grasslands (12,13,44)
Waterbodies (14-21)
Wetlands (22,23,24,73)
Barren Land (25,26,28,29,30,31,45)
Eroded Lands (27)
Cultivated Commercial Permanent Orchards (32,35)
Cultivated Commercial Permanent Vines (33)
Commercial Annuals Pivot Irrigated (34,38)
Commercial Annuals Non-Pivot (36,37,39,40)
Cultivated Subsistence (41)
Built-up Residential All (47-56,61-64)
Built-up Smallholdings (57-60)
Built-up Commercial (65)
Built-up Industrial (66)
Mines (68-72)
LANDCOVER CHANGE CLASSES
1990
2022
% Change

Conclusions

- The Department has the in-house ability to generate National Land Cover on a regular basis via the CALC system
- Able to undertake biennial land-cover change assessments and geo-statistical reporting
- Ability to have time series of environmental change from the baseline of 1990 and into the future
- By having a synoptic view of our resources, we are able to quickly assess, monitor change and make informed decisions

THANK YOU!

"…while land cover can be observed on the ground or by airplane, the most efficient way to map it is from space"

(NASA Earth Observatory)

Land-cover data provided by: the Directorate Environmental Spatial Information

Compiled by: the Chief Directorate: Environmental Knowledge and Information Management
Presented by: Dr Zakariyyaa Oumar

forestry, fisheries & the environment
Department: Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

2030 NDP