

EASTERN CAPE

LAND & WATER USE



TABLE 1

Areas and percentage change of land cover groups between 1990 and 2013/14 for the Eastern Cape.

Land cover group	1990 Area (km²)	2013-14 Area (km²)	Change (%)
Waterbodies (WB)	487	474	-0.010
Wetlands (WTL)	1699	1185	-0.390
Indigenous Forest (INF)	868	1020	0.116
Thicket / Dense bush (TDB)	9444	1947	5.690
Woodland / Open bush (WOB)	1651	4417	2.097
Grassland (GRS)	49414	54633	3.957
Low shrubland (LSB)	33640	27072	-4.980
Mines (MNS)	59	33	-0.020
Bare non-vegetated (BNV)	12039	4451	-5.754
Plantations / Woodlots (PWD)	1195	1207	0.009
Cultivated commercial annuals (CCA)	4331	4221	-0.084
Cultivated perennial (CPE)	460	376	-0.063
Cultivated subsistence (CSB)	5597	5958	0.274
Low shrubland (LSB)	6083	5113	-0.735
Urban	4915	4774	-0.107



WARMS DATABASE (updated up to August 2016)

Most water volumes are registered in the Eastern Cape for taking water (1.90 billion m³ a⁻¹, the third highest province in the country), storing water (0.33 billion m³) and discharging wastewater (0.14 billion m³ a⁻¹).

The highest water withdrawals per sector were for agricultural irrigation (1.33 billion m³ a⁻¹ or 70.3% of the total) and water supply services (0.53 billion m³ a⁻¹ or 28.1%).

By water resource types, water is taken mainly from water schemes (58.2%), rivers/streams (28.7%) and boreholes (6.4%).



NATIONAL LAND COVER (NLC) MAPS of 1990 & 2013/14:

The main changes in land cover between 1990 and 2013/14 occurred for **thicket/dense bush (+5.690%)**, **bare non-vegetated land (-5.754%)**, **low shrubland (-4.980%)** and **grassland (+3.957%)** (Table 1).

The largest areas in the Eastern Cape are covered by **grassland 70,404km²**, **low shrubland 34,712km²** & **thicket/dense bush 21,702km²** (Figure 1).



ETLOOK ANNUAL EVAPOTRANSPIRATION (ET) DATA (from August 2014 to July 2015):

ET is variable depending on geographic position, climate and land cover (Figure 2). Besides waterbodies, the highest median annual water use per unit area was from indigenous forest (842 mm a⁻¹) and the lowest from bare non-vegetated land (80 mm a⁻¹) (Table 2).

In absolute terms, the largest water use was from **grassland (31,990 Mm³ a⁻¹)**, **thicket/dense bush (11,394 Mm³ a⁻¹)** and **low shrubland (7,292 Mm³ a⁻¹)**.

FIGURE 1

Land cover groups based on the National Land Cover (NLC) map of 2013/14 for the Eastern Cape.

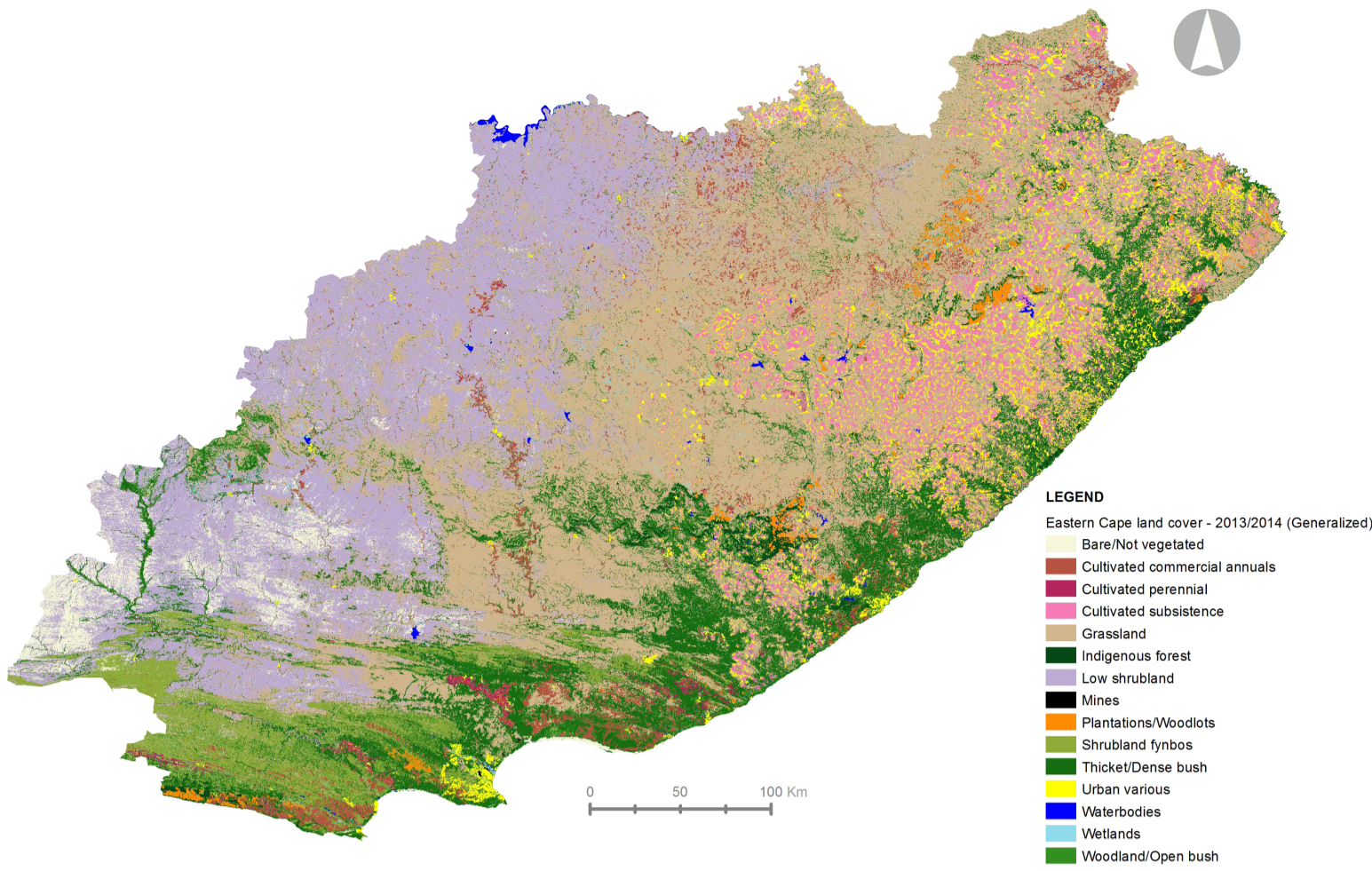


FIGURE 2

Annual ETLook evapotranspiration (ET) in 2014/15:

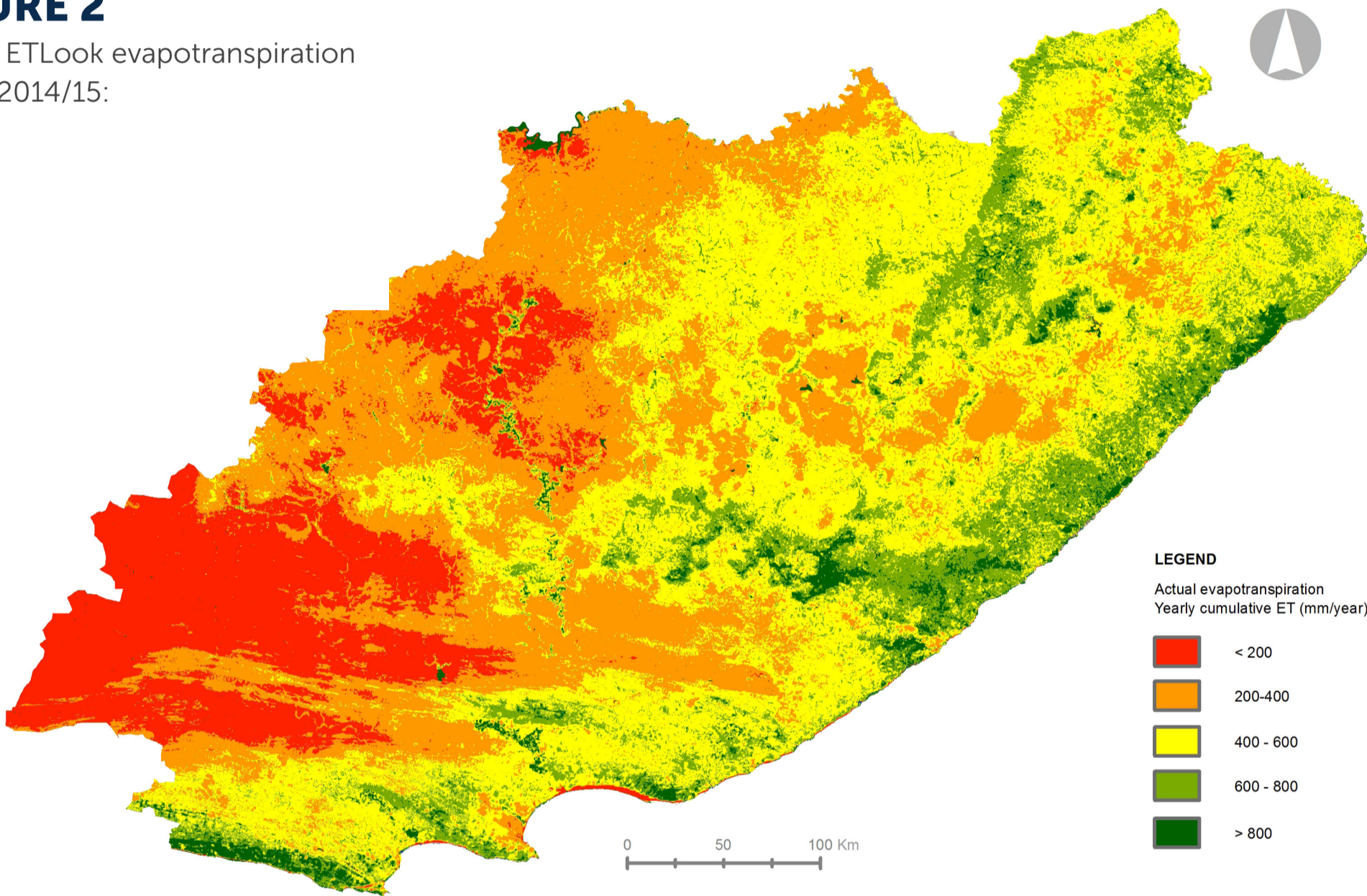


TABLE 2

Water use statistics for land cover groups based on annual ETLook data in 2014/15 for the Eastern Cape:

Land use	Water use statistics						CUM (Mm³ a⁻¹)
	MEAN mm (a⁻¹)	MEDIAN (mm a⁻¹)	MIN (mm a⁻¹)	MAX (mm a⁻¹)	STD (mm a⁻¹)	AREA (km²)	
Waterbodies (WB)	1358	1705	10	2223	766	543	925
Wetlands (WTL)	521	512	9	2203	229	1495	765
Indigenous Forest (INF)	835	842	78	1925	146	1357	1143
Thicket / Dense bush (TDB)	528	525	10	2203	172	21702	11394
Woodland / Open bush (WOB)	430	439	10	2215	177	5613	2462
Grassland (GRS)	453	454	10	2223	136	70404	31990
Shrubland fynbos (SHF)	422	438	8	1842	162	6443	2820
Low shrubland (LSB)	224	210	8	2208	109	34712	7292
Cultivated commercial annuals (CCA)	574	554	14	2203	199	5072	2811
Cultivated perennial (CPE)	768	739	128	2100	208	476	352
Cultivated subsistence (CSB)	523	520	122	1991	132	7988	4150
Cultivated cane (CC)	802	813	543	926	87	0	0
Plantations / Woodlots (PWD)	749	751	54	2117	160	1831	1374
Mines (MNS)	307	281	19	2063	162	41	11
Bare non-vegetated (BNV)	129	80	8	2208	148	5622	451
Urban industrial (UIND)	320	309	95	2012	116	37	11
Urban commercial (UC)	352	314	95	1588	164	47	15
Urban residential (UR)	335	332	59	1769	105	226	75
Urban sport and recreation (ORS)	358	352	86	2098	119	286	101
Urban informal (UINF)	465	423	59	1990	200	92	39
Urban Others (UO)	449	443	15	2099	118	5639	2497

FIGURE 3

Daily average air temperatures for different land covers in the Eastern Cape based on NASA/GMAO Modern Era Retrospective Analysis (MERRA) from 2000 to 2012.

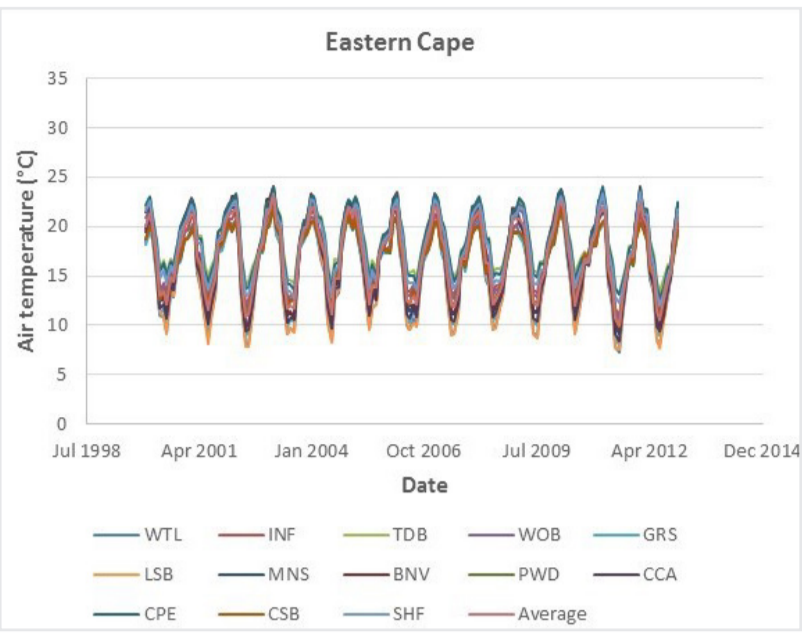


FIGURE 4

Monthly rainfall at representative stations in the Eastern Cape (South African Weather Services) from 2000 to 2012.

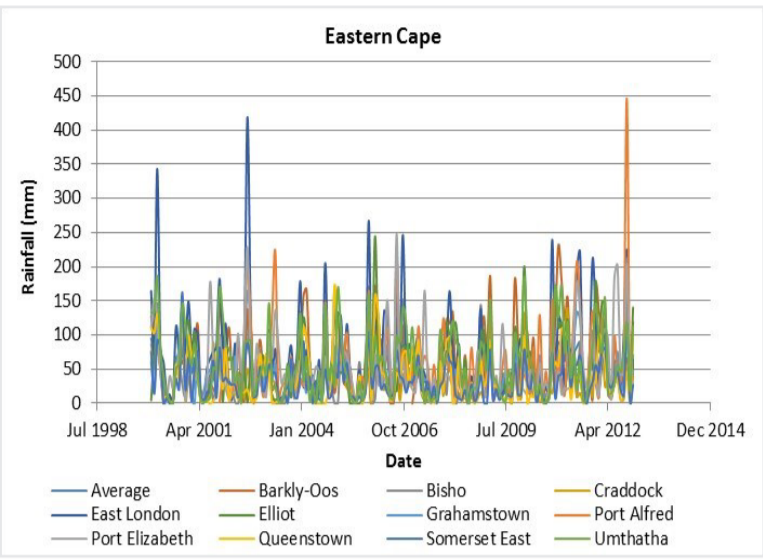
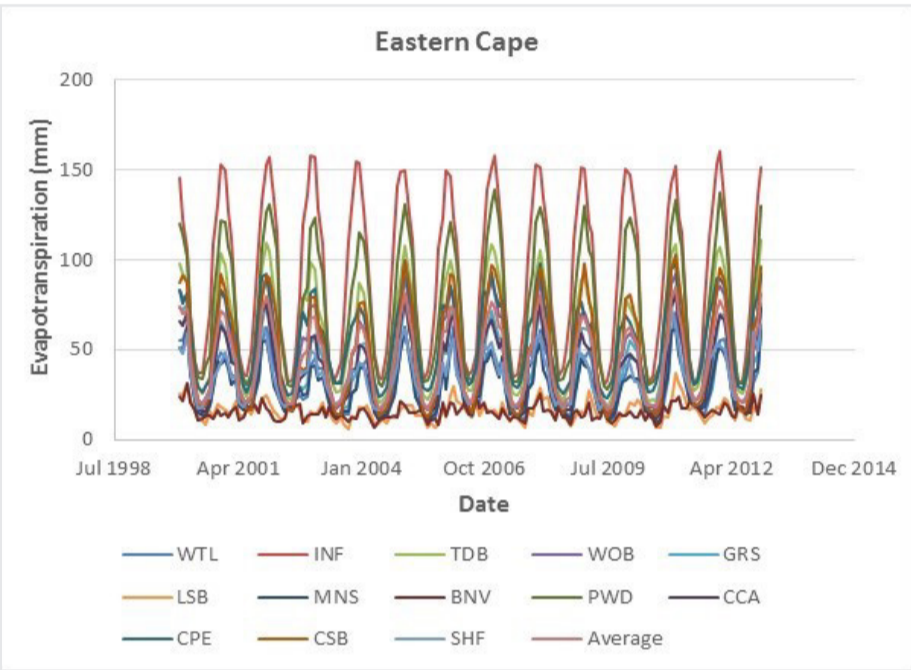


FIGURE 5

Monthly MOD16 evapotranspiration for different land cover groups in the Eastern Cape from 2000 to 2012.



MOD16 MONTHLY EVAPOTRANSPIRATION (ET) DATA (FROM 2000 TO 2012)

- Daily average air temperatures in the Eastern Cape range from about 8°C to 24°C (Figure 3).
- Monthly rainfall exhibits large variations depending on geographical and climatic conditions (Figure 4).
- MOD16 ET range from about 15 mm month⁻¹ up to peaks of 150 mm month⁻¹ in areas of indigenous forests.

GUIDELINES AND RECOMMENDATIONS

- Incentivizing smart farming practices may reduce the volumes used in agriculture and the burden on water resources.
- Increased industrial development will likely impact on industrial and total water use.
- The existing pool of wastewater streams can potentially become an available water–reuse source (currently 3.7% of water abstracted is re-used for wastewater irrigation).
- The limited use of boreholes leaves scope for increased groundwater use.
- Non-commercial and non-conservation land under vast thicket/dense bush and grassland can be traded off to reduce encroachment and water use. Changes in land use indicated low shrubland is mainly replaced by grassland, possibly for agriculture. Conservation efforts need to be strengthened to prevent loss of shrubland fynbos.

ACKNOWLEDGMENTS AND SOURCES OF INFORMATION:

Water Authorisation and Registration Management System (WARMS)
National Land Cover (NLC) maps for 1990 and 2013/14
Satellite-derived images and products (ETLook and MOD16 evapotranspiration)
Ground measurements of climatic variables (SAWS)
NASA/GMAO Modern Era Retrospective Analysis (MERRA)



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