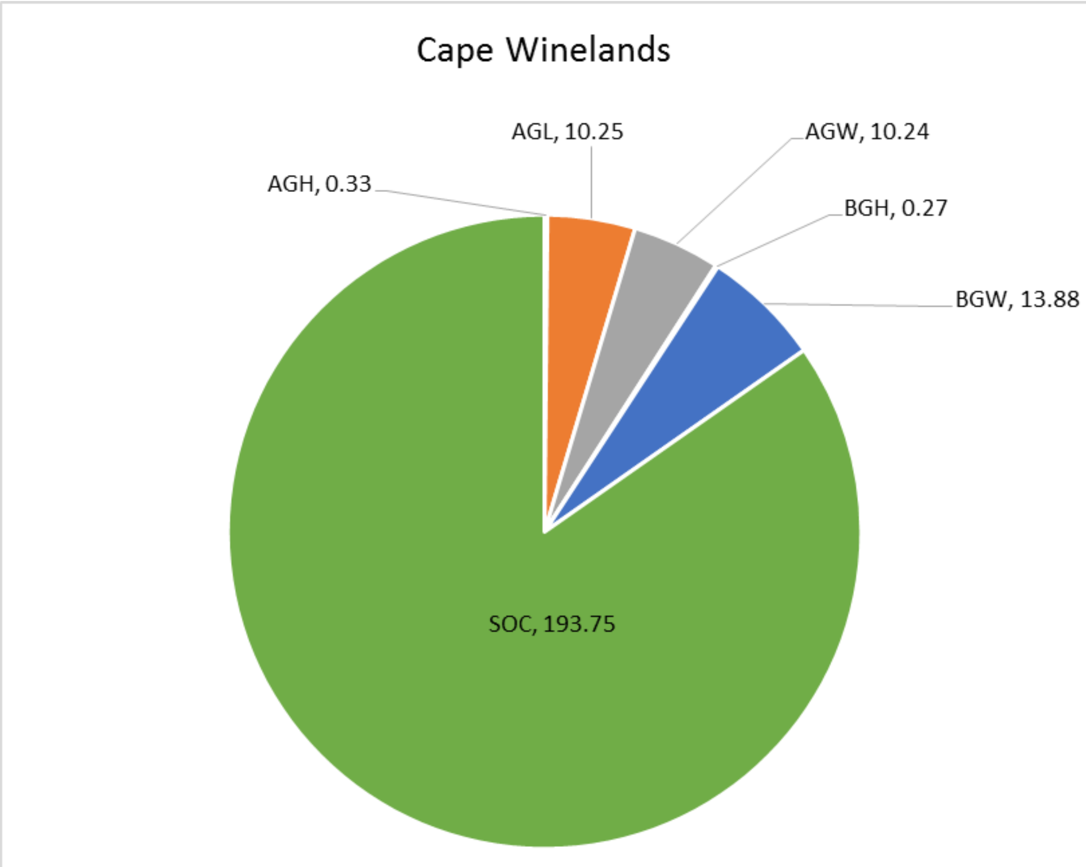
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

2019 National Terrestrial Carbon Sinks Assessment for South Africa

District Municipality Profile | Cape Winelands

Organic carbon pools



igure 1. The split of different carbon pools: SOC = Soil Organic Carbon, BGW = Below Ground Woody Biomass, AGW = Above Ground Woody Biomass, AGH = Above Ground Herbaceous Biomass. Biomass Carbon including BGH = Below Ground Herbaceous Biomass and AGL = Above Ground Litter Biomass**. Please see Note 1** for an explanation of the carbon pools used in the NTCSA 2020 and how they were created.

The total of the different terrestrial carbon pools within the district of **Cape Winelands** are estimated to be **194 Tg** and distributed per carbon pool as depicted in the Figure (1) above. Most carbon is to be found as soil organic carbon (SOC). The models that estimate the proportion of carbon as above ground woody carbon (AGW) are based **on satellite imagery** and do not differentiate between **natural woody vegetation** or planted trees. Below ground woody (BGW) biomass carbon is estimated as a proportion of the above ground woody biomass, and varies across the country based on climate. Above ground herbaceous biomass carbon **(AGH)** and below ground herbaceous biomass carbon **(BGH)** includes both natural vegetation and annual fields crops in the proportions as mapped by the NLC 2018. Litter is estimated based on published biome level studies, and also includes dead wood which is calculated as a proportion of live woody biomass.

SOURCE:

Land cover classes in 2018 (from national land cover map)

Land cover is used to determine changes in **carbon stocks**, as land cover change is considered as one of the key drivers for change in terrestrial carbon. Data from three national land cover products, NLC **1990, NLC 2014 and NLC 2018** are compared against 17 (or 18) land cover classes **(see Note 2).** Three of the land cover classes can be regarded as natural vegetation, the wetlands class, the indigenous closed canopy forest land cover class and other natural vegetation class (which includes woodlands, grasslands, fynbos, savanna, thicket, karoo and other natural vegetation). The water land cover class includes both man-made and natural water bodies. All other land cover classes represent land that has been transformed by humans from natural vegetation to an altered land cover and use. Only the **2018 land** cover includes **fallow land,** which was mapped as **natural land** or **agricultural land** in earlier land cover products. The **bare ground** land cover classes was found to show large changes in extent between land cover products, possibly as a consequence of that years rainfall. Figure 2 gives a summary of land cover classes as mapped in the 2018 NLC. Table 1 summarises important **changes in land cover for the district between 1990, 2014 and 2018.**

Cape Winelands is the **26 highest rate of land lost to urbanisation** between **1990 and 2018** out of the 52 South African districts, with **89 km^2 of natural** or **agricultural land converted to urban expansion.**

Cape Winelands has the **36 highest rate of land lost to irrigation** between **1990 and 2018** out of the 52 South African districts.

Cape Winelands lost **57 ha of dryland agricultural land** between 1990 and 2018.

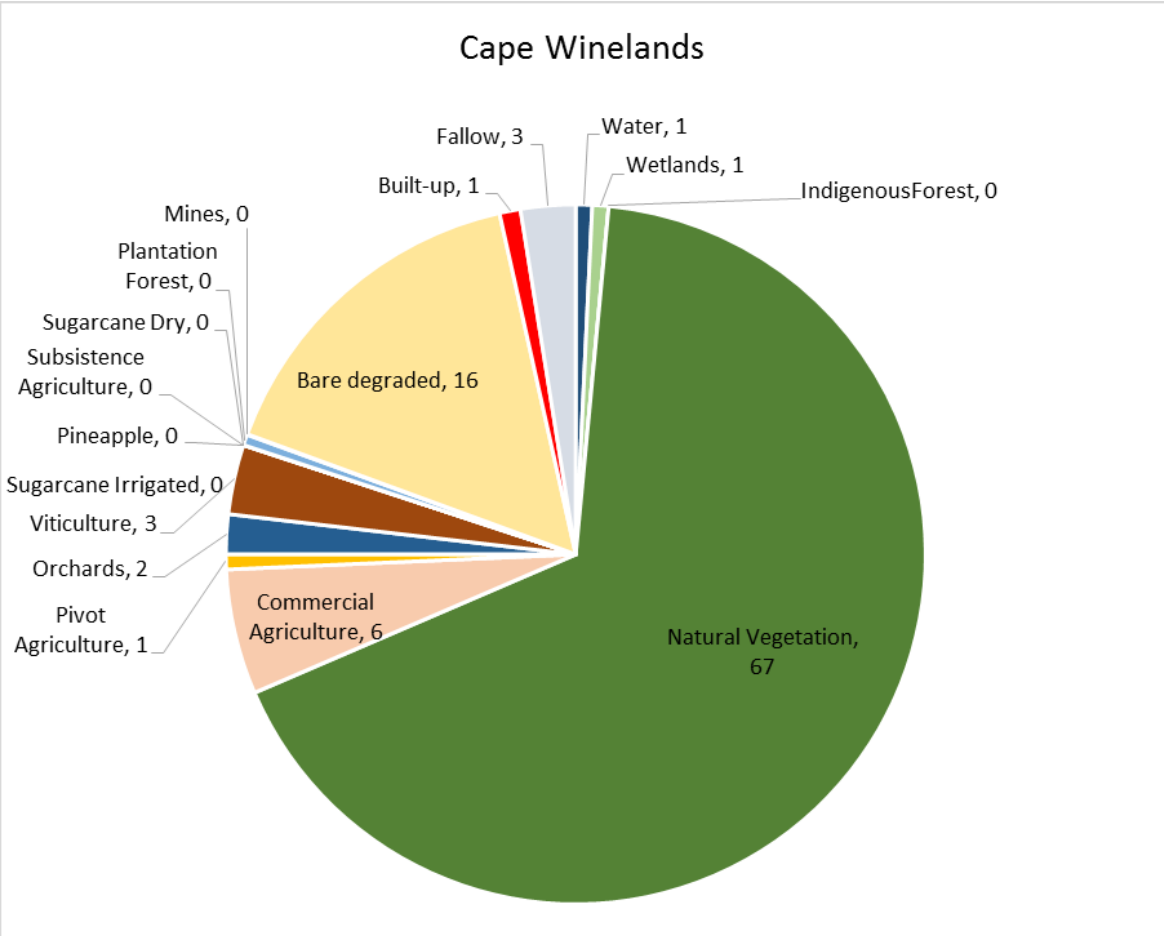


Figure 2. Estimates of the proportion of the district in each land cover class in 2018 as mapped by 2018 NLC. Note, wetlands and indigenous forest, though natural vegetation, are displayed separately from other natural vegetation.

SOURCE:

Table 1. Drivers of change based on national land cover data from 1990, 2014 and 2018 **(see Note 3** on how this data were generated, and how to interpret it).

	Area in km^2			% of total land area			Decrease (-) or increase (+) in land area of each land type between 1990 and 2018	
	1990	2014	2018	1990	2014	2018	Km^2	% of total area
Water	166	181	162	1	1	1	-4	0
Wetlands	311	241	161	1	1	1	-150	-1
Indigenous Forest	0	0	0	0	0	0	0	0
Natural Vegetation	16323	15856	14382	76	74	67	-1941	-9
Commercial Agriculture	1303	1205	1241	6	6	6	-62	0
Pivot Agriculture	47	70	149	0	0	1	102	0
Orchards	335	283	394	2	1	2	60	0
Viticulture	858	1059	690	4	5	3	-168	-1
Pineapple	0	0	0	0	0	0	0	0
Subsistence Agriculture	0	0	0	0	0	0	0	0
Sugarcane Irrigated	0	0	0	0	0	0	0	0
Sugarcane Dry	0	0	0	0	0	0	0	0
Plantation Forest	176	89	107	1	0	0	-70	0
Mines	5	5	6	0	0	0	1	0
Bare degraded	1815	2331	3415	8	11	16	1600	7
Built-up	120	140	209	1	1	1	89	0
Fallow	0	0	543	0	0	3	543	3

Loss in soil organic carbon (SOC) over time

Soil organic carbon loss is based on estimates of loss due to land cover change. Estimates of the total loss of SOC in the district based on both historic and recent land cover is given in table 2. In addition crude estimates are given on total carbon gains that might be possible from changed farming practices. Actual gains that can be realised will require local data based on local research, local crop choices, local farming practices and soil and climatic conditions.

Table 2. Estimated Soil Organic Carbon (SOC) loss due to agricultural activities and estimates of potential gains if all land cover was converted to conservation agriculture. Note: the extent to which conservation agriculture can restore SOC has not been established for the municipality, but will depend of crop choice, management methods, soil type and climate (**see Note 4** on how this data was generated, and how to interpret it).

	Estimated loss (-) or gain (+) in soil organic carbon due to land use. Tg C			Estimated potential 20 year gains from conservation agriculture, assuming a 25%, 50% or 75% of lost SOC is regained Tg C		
	Loss before 1990	Total loss by 2014*	Total loss by 2018*	25%	50%	75%
Commercial Agriculture	0.118	0.110	0.121	0.030	0.061	0.091
Pivot Agriculture	0.000	0.001	0.003	0.001	0.001	0.002
Orchards	0.001	0.001	0.002	0.001	0.001	0.002
Viticulture	0.006	0.007	0.004	0.001	0.002	0.003
Pineapple	0.000	0.000	0.000	0.000	0.000	0.000
Subsistence Agriculture	0.000	0.000	0.000	0.000	0.000	0.000
Sugarcane Irrigated	0.000	0.000	0.000	0.000	0.000	0.000
Sugarcane Dry	0.000	0.000	0.000	0.000	0.000	0.000
Bare degraded	0.053	0.124	0.234	0.058	0.117	0.175
Fallow	Not estimated in 1990 or 2014		0.005	0.030	0.010	0.015
Built-up	Zero loss was assumed based on IPCC recommendations, but in reality this will depend on land use within the build-up area					
Total	0.179	0.242	0.385	0.096	0.192	0.289

- Note, total change might reduce within a class over time because land in that class reverts to a different land use class. Change between 2014 and 2018 is due to the inclusion of fallow land losses in the 2018 data, and should not be interpreted as a change between those two years. The 1990 to 2014 change data should be used to best understand long-term rates of loss, as the methodology for these two data sets was very similar.