

DEPARTMENT OF RURAL DEVELOPMENT AND LAND REFORM

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Rural Development and Land Reform
REPUBLIC OF SOUTH AFRICA

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SOUTH AFRICAN LAND COVER CLASSES AND DEFINITIONS APPROVED IN TERMS OF SPATIAL DATA INFRASTRUCTURE ACT NO 54, 2003

ABSTRACT

The South African user needs survey of land cover classes and definitions conducted in May- June 2016 concluded on the classes and definitions listed in this document. The demand to have a standardised and compatible the land cover data sets it's important for the mapping and monitoring wide areas in a consistent manner. These classes are developed in a hierarchical structure because it offers the consistency and accommodates different levels of information depending on the scale of mapping and the source data used for mapping. The structure has 4 levels and can be defined as higher to lower level. The higher levels are defined as analytical criteria and at the lower levels the analytical criteria increases. Class criteria are not repeated per level. Level 4 is a class measure which is based on the source data to be used during mapping, it also dependent on the scale of mapping. Those class measures that have not identified measure, the end use can

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identify them based on the user's requirement. Classes and definitions are important in order to develop sustainable land cover mapping, a harmonised collection of data at any scale. This means that any land cover data identified anywhere in South Africa is readily accommodated in this structure of classes and definitions.

The definitions of classes considered all South African legislation affected in order to have the same meaning of class.

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Class: No	Level1: Class	Class Definition	Class : No	Level 2: Class	Class Definition	Class : No	Level3: Class	Class Definition	Level 4: Class Measure
1	Forest land	Land with natural or planted woody vegetation of any height greater than 2.5m; of which the canopies cover more than 5% of the land area; including land which is temporarily barren, but bears evidence of recent previous tree cover. This land cover class excludes fynbos and karoo shrubland, as well as tree crops cultivated for the production of food or beverages; e.g. tea plantations, vineyards, and orchards of fruit and nut crops	1.1	Natural wooded land	This class includes any land cover that of natural perennial woody vegetation of any condition; excluding fynbos or karoo shrubland. The minimum canopy should be typically equal or greater than 2.5m.	1.1.1	Contiguous Forest	Natural woody vegetation of any height that is not Fynbos or Karoo shrubland. Canopies of the wooded vegetation layer cover more than 75% of the land surface.	Very high Contiguous Forest > 20m
									High Contiguous Forest > 12m <20m
									Medium Contiguous Forest >6m <12m
									Low Contiguous Forest <2.5m <6m
									Very high Dense forest and woodland >20m
									High Dense forest and woodland >12m <20m
			1.1.2				Dense forest and woodland	Natural woody vegetation of any height that is not Fynbos or Karoo shrubland. Canopies of the wooded vegetation layer cover less than 75% and more than 35% of the land surface.	Medium high Dense forest and woodland >6m, 12m
									Low Dense forest and woodland <2.5m <6m
									Very high Open woodland > 20m
									High Open woodland > 12m <20m
			1.1.3				Open woodland	Natural woody vegetation of any height that is not Fynbos or Karoo shrubland. Canopies of the wooded vegetation layer cover less than 35% and more than 10% of the land surface.	Medium high Open woodland >6m, 12m
									Low Open woodland <2.5m <6m

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							1.1.4	Sparsely wooded land	Natural woody vegetation of any height that is not Fynbos or Karoo shrubland. Canopies of the wooded vegetation layer cover less than 10% and more than 5% of the land surface.	Very high Sparsely wooded land > 20m High Sparsely wooded land > 12m < 20m Medium high Sparsely wooded land > 6m < 12m Low Sparsely wooded land < 2.5m < 6m
							1.1.5	Thicket	Areas typically including all woody, self-supporting, single or multi stemmed plants with, in most cases no clearly definable structure. Essentially an indigenous species, growing under natural or semi-natural conditions (although it may include some areas of self-seeded exotic species, especially along riparian zones).	-
							1.2	Planted forest	All areas of systematically or randomly planted (or cultivated), woody vegetation composed primarily of exotic species or indigenous species. Category includes both young and mature tree stands; excludes all non-woody species (such as sisal), as well as woody crops mainly grown for food and beverages (e.g. tea, vineyards, citrus or nut crops).	Very high Contiguous planted forest > 20m High Contiguous planted forest > 12m < 20m Medium Contiguous planted forest > 6m < 12m Low Contiguous planted forest < 2.5m < 6
							1.2.1	Contiguous planted forest	All areas of systematically planted (or cultivated), managed vegetation composed of, primarily exotic species (including hybrids), with greater than 75% canopy cover.	

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						1.2.2	Dense planted forest	All areas of systematically planted (or cultivated), managed vegetation composed of primarily exotic species (including hybrids) with canopy cover between 35% - 75%.	Very high planted forest > 20m High Dense planted forest > 12m <20m Low Dense planted forest <2.5m <6m
						1.2.3	Open planted forest	All areas of systematically planted (or cultivated), managed vegetation composed of primarily exotic species (including hybrids) with canopy cover between 10% - 35%.	Very high planted forest > 20m High Open planted forest > 12m <20m Medium high Open planted forest >6m , 12m Low Open planted forest <2.5m <6m
						1.2.4	Sparse planted forest	All areas of systematically planted (or cultivated), managed vegetation composed of primarily exotic species (including hybrids) with canopy cover between 5% - 10%.	Very high planted forest > 20m High Sparse planted forest > 12m <20m Medium high Sparse planted forest >6m , 12m Low Sparse planted forest <2.5m <6m

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								Temporary unplanted: Plantation areas that were clear-felled and have not been replanted yet. Currently denuded of plantation trees but the intent exists that it will be re-forested in future. One has to keep this as a separate class because: • this class indicates timber harvesting • there can theoretically be transition to a new species or other type of land cover • there is no species current - one would only be able to identify a species retrospectively (i.e. previous images).	
			1.2.5				Temporary unplanted		
			1.2.6				Other tree stands	Mainly mixed species, multiple age class, irregularly spaced. Area of various tree species of mostly exotic trees as groups in small plots or stands.	

Class: No	Level1: Class	Class Definition	Class : No	Level 2: Class	Class Definition	Class : No	Level3:	Class: No	Level 4: Class Measure
2	Shrubland	Shrublands or the shrub class is the community dominated by low, woody, self-supporting, multi-stemmed plants branching at or near the ground, between 0.2 m > 5 m in height, and with a total tree cover < 0.1 %.	2.1	Shrubs	Shrubs are typically broad-leaved or bushes, frequently deciduous. They are largely classified as woody vegetation with a height lower than 5m (from LOML glossary).	2.1.1	Closed shrubland	Shrublands or the shrub class is a class dominated by low, woody, self-supporting, multi-stemmed plants branching at or near the ground, between 0.2 m and 2 m in height, and with a plant canopy greater than 75%.	
			2.2	Karoo and fynbos shrubland	Typically areas dominated by dwarf shrubs generally less than 1m high.	2.2.1	Fynbos	Fynbos is a fire-prone shrubland dominated by small-leaved, evergreen shrubs typically occurring on nutrient poor sandy soils, also on limestone, leached clay soils and gravelly soils.	Very high Fynbos (Supply values) High Fynbos (Supply values) Medium high Fynbos (Supply values) Low Fynbos (and burnt) (Supply values)

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						2.2.2	Karoo shrubland	Area dominated by dwarf shrubs (generally less than 1 m tall) intermixed with grasses, succulents, geophytes and annual forbs.	
						2.2.3	Succulent Karoo	Areas dominated by leaf-succulent shrubs typically occurring in areas dominated by winter rainfall distribution in South Africa.	
3	Grassland	Areas typically dominated by indigenous herbaceous graminoids (grasses) with > 4% vegetation cover. Areas may contain up to 5% woody cover. This may also include non-graminoids, herbaceous vegetation such as Namaqualand flowers	3.1	Natural grassland	Essentially indigenous species growing under natural or semi-natural conditions. Typically associated with the Grassland and Savanna biomes.	3.1.1	Natural grassland	Essentially indigenous species growing under natural or semi-natural conditions. Typically associated with the Grassland and Savanna biomes.	

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Class: No	Level1: Class	Class Definition	Class : No	Level 2: Class	Class Definition	Class : No	Level3: Class	Class Definition	Level 4: Class Measure
4	Waterbodies	This class includes all natural and artificial surface water features. This category entails permanent and seasonal features such as rivers, pans, major reservoirs, farm-level irrigation dams, pans, lakes, lagoons and flooded mine pits	4.1	Natural	Waterbodies occurring naturally in a landscape.		Rivers	Perennial and non-perennial flowing rivers which can be subdivided into permanent or seasonal rivers.	
							Estuaries and lagoons	Waterbodies associated with oceans which occur at the mouth of rivers or are replenished by tidal flow.	
							Ocean	Saltwater waterbodies.	
							Lakes	Large standing waterbodies with fresh water.	
							Pans	Pans that contain surface water at the time of observation.	Perennial Pans Non-perennial pans
			4.2	Artificial	Waterbodies formed through human intervention (artificial).		Dams	Infrastructure constructed for the purpose of water use whereby a dam wall is built interrupting the flow of rivers.	
							Canals	Artificial waterway largely used for agricultural purposes.	
							Sewage pods	Infrastructure constructed by building wall for the purpose of sewage treatment and that's where sewage ends.	
							Flooded mine pits	Waterbodies associated with or created by mining activities	

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5	Wetlands	Natural or artificial areas where the water level is permanently or temporarily at (or very near) the land surface, typically covered in either herbaceous or woody vegetation cover. The category includes fresh, brackish, salt-water conditions and floating vegetation but excludes areas with only occasional flooding. Examples include reed-marsh or papyrus-swamp.	5.1	Herbaceous wetlands	These are wetlands covered in permanent or seasonal herbaceous vegetation, whose boundary is mapped on the bases of observable surface vegetation patterns.	5.1.1	Rooted	Rooted herbaceous wetland thrive in waterlogged soils and produce extensive root systems. These includes plants such as typha domingensis.	
						5.1.2	Non-rooted (floating vegetation)	The non-rooted or floating herbaceous wetland includes floating vegetation such as grass meadows.	
			5.2	Woody wetlands	As above, except characterized by trees, i.e. mangroves.	5.2.1	Mangroves	Mangroves are salt tolerant woodland or shrubland adapted to life in harsh coastal conditions such as brackish water to pure sea-water.	
						5.2.2	Others		
			6.1	Consolidated	Natural areas of exposed rock or permanently dry-pans (or hard-pans) associated with a surface crust. Agricultural fields with no crop cover, and open cast mines and quarries are excluded. The surface may consist of large coarse fragments.	6.1.1	Natural rock surface	Areas with exposed rock surface	
6	Barren land	Barren lands are described as natural and artificial non-vegetated areas. (excluding features such as agricultural fields with no crop cover, and mining activities and built-up), where the substrate or soil exposure is clearly apparent.	6.2	Unconsolidated	Natural areas of exposed bare soil with no, or very little vegetation cover during any time of the year, (excluding agricultural fields with no crop cover, and open cast mines and quarries). These may also include loose and shifting sand.	6.2.1	Dry pans	These are areas of hard soil surface that are impenetrable by water and / or plant roots.	
								This entails removal of top soil by water wind or ice resulting to gullies.	Donga \ Gully erosion
							Eroded lands		Sheet erosion

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						6.2.2	Sand dunes	These are ridges or hills of sand which are common features of shoreline and desert environment. They provide habitat for plants and animals including rare and endangered species.	
						6.2.3	Coastal dunes	These are sand dunes occurring in coastal areas.	
						6.2.4	Beach sand	This is the zone above the waterline at a shore of a body of water, marked by an accumulation of sand that has been deposited by the tide or waves.	
						6.2.5	Riverbed material	This entails the material where the river channel once existed.	
						6.2.6	Others		
7	Cultivated	Cultivated lands are areas where the natural vegetation has been removed and replaced by a different type of vegetative cover either on an annual or perennial basis through human intervention and seasonal modification with the intent to harvest. The surface may be temporarily without vegetative cover.	7.1	Permanent crops	Lands cultivated with crops that occupy the area for periods longer than two growth seasons and are not replanted after harvest. Replantation can however occur after the lifespan of the specific crop. Examples would include tea plantations, vineyards, sugarcane and citrus orchards, hops and nuts.	7.1.1	Irrigated	This refers to production practices that mostly rely on additional water sources during the growth period of the crop. This additional water can be from any water source (borehole, dams, rivers etc.) and applied to the crop through various irrigation mechanisms (pivot, drip, drag line etc.).	



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8	Built-up	A generic class, essentially comprising all built-up areas, in which people reside on a permanent or near-permanent basis, identifiable by the high density of residential and associated infrastructure. Includes both towns, villages, and where applicable, the central nucleus of more open, rural clusters, and urban periphery areas. This class also includes commercial, industrial, transportation and any other constructed areas (excluding mines and quarries).	8.1	Residential		Built-up non-linear areas in which people reside on a permanent or near-permanent basis. This includes villages, formal and informal settlements from high to low building density.	8.1.1	Formal	All structures built on a planned, and formal infrastructure base (typically observed through a road infrastructure)	High density
										Medium density
										Low density
			8.2	Village		Occurs within a rural environment which can be scattered or dense and may include farm stands.	8.2.1	Scattered	All structures built without any planned or formal infrastructure base	
									Scattered or dispersed settlement is one of the main types of settlement patterns to classify rural areas in South Africa. These are characterised by vast distance between two households.	
							8.2.2	Dense rural	Dense rural settlements are characterised by rural dwellings close to each other.	
			8.2	Small holdings / Pre-urban SPLUMA		Formal agriculture holdings, small holdings and peri-urban areas with similar characteristics.	8.2.1		Formal agriculture holdings, small holdings and peri-urban areas with similar characteristics.	

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			8.3	Urban vegetation	All transformed vegetation within built-up areas that cannot be classed under any other classes (forest land, shrubland, grassland or cultivated). It includes all open green spaces within an urban area, which provides for recreational activities. Examples include urban parks, playgrounds, paths, sports fields, golf courses and picnic areas.	8.3.1	Recreational fields	Recreational fields may include sport grounds, golf course, urban parks and picnic areas.	
			8.4	Commercial	Built-up surface for non-residential areas used primarily for the conduct of commerce and other mercantile business, typically located in the central business district (CBD). Often consisting of a concentration of multi-level buildings, but also includes small commercial zones (i.e. spaza shops) within former black townships.	8.4.1	Commercial	Built-up surface for non-residential areas used primarily for the conduct of commerce and other mercantile business, typically located in the central business district (CBD). Often consisting of a concentration of multi-level buildings, but also includes small commercial zones (i.e. spaza shops) within former black townships.	
			8.5	Industrial	A built-up surface for non-residential areas with major industrial (i.e. manufacture and/or processing of goods and products). Example would include office parks, industrial parks, power stations (renewable energy infrastructure), steel mills.	8.5.1	Light	Light industry are characterised by activities that produce relatively small amount of smoke and other effluents, noise and dust. Light industry includes facilities such as storage, clothes consumer electronics and home appliances manufactures	

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						8.5.2	Heavy	Heavy industry is characterised by big plants covering large areas of land. Examples include steel, oil refining, ship building industries.	
						8.6.1	Roads	This is a linear feature subdivided to paved and unpaved material. Paved roads are covered with an artificial material to consolidate the soil surface, whereas unpaved roads are either bare and consist of a compressed surface or are covered with unconsolidated material like gravel.	
					This category relates to any transport, communication or supply system that is built as a linear structure in order to connect two locations (for example roads, railways, electric lines, pipe lines, etc.).	8.6.2	Railways	The area is characterised by a combination of materials (such as wood, gravel concrete, iron) to form a very specific linear structure for train transport.	
						8.6.3	Airfields	These are area strips for aircraft take-off and landing.	
						8.6.4	Harbours	Terrestrial infrastructure associated with harbours and ports.	

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9	Mines and quarries	Areas in which mining activity has been conducted. This includes both opencast mines and quarries, evaporative mines (salt mines) as well as surface infrastructure, mine dumps, etc. associated with underground mining activities.	9.1	Surface infrastructure	Surface infrastructure supporting sub surface and surface mining activities.	9.1.1	Mine buildings and machinery	This entails all infrastructure material used to support mining activities.	
			9.2	Extraction sites	Active or non-active surface-based mining activities. This involves mining in which soils and rocks overlaying the mineral deposits are removed. Types of mining include: strip mining, open-pit mining, mountain top removal and dredging mining.	9.2.1	Open cast mine	This is a type of surface mining in which mineral resources are removed from the earth through large holes into the surface	

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			9.2.2				Quarries	Quarries are excavation or pits largely for extraction of building stone and / or gravel.	
			9.2.3				Dredging	Dredging is the removal of sediments and debris from the bottom of lakes, harbours, rivers and other waterbodies commonly conducted to clear water channels for transportation.	
			9.2.4				Salt mines	This is a mine from which halite commonly known as rock salt is extracted	
			9.3.1	Mine waste and resource dumps	Artificial dumps consisting of mine waste material or stock pile resources.		Tailing dams / Mine waste	This is soil or rock pile waste material which is removed to gain access to buried ore when mining occurs. This is usually occurring by filling up big hole created to dump such waste which also has water when it rains	
			9.3.2				Stock piles	This is soil or rock pile material which is removed to gain access to buried ore when mining occurs.	