Appendix 4: Land Cover, Field guide

Council for Scientific and Industrial Research - Satellite Applications Centre (CSIR-SAC).

Field guide for the National Land Cover 2000 database project.

FIELD GUIDE

A4.1. FOREST & WOODLAND

All wooded areas with greater than 10% tree canopy cover, where the canopy is composed of mainly self-supporting, single stemmed, woody plants >5 m in height. Essentially indigenous tree species, growing under natural or semi-natural conditions (although it may include some localised areas of self-seeded exotic species). Excludes planted forests (and woodlots). Typically associated with the Forest and Savanna biomes in South Africa

A4.1.1 Forest

Tree canopy cover > 70%. A multi-strata community, with interlocking canopies, composed of canopy, subcanopy, shrub and herb layers.

A4.1.2 Woodland

Tree canopy cover between 40-70%. A closed-to-open canopy community, typically consisting of a single tree canopy layer and a herb (grass) layer.

A4.1.3 Wooded Grassland

Tree canopy cover between 10-40%. An open-to-sparse canopy community, typically consisting of a single tree canopy layer and a herb (grass) layer.

A4.2. THICKET, BUSHLAND, SCRUB FOREST & HIGH FYNBOS

Communities typically composed of tall, woody, self-supporting, single and/or multi-stemmed plants (branching at or near the ground), with, in most cases no clearly definable structure. Total canopy cover > 10%, with canopy height between 2 - 5 m. Essentially indigenous species, growing under natural or semi-natural conditions (although it may include some localised areas of self-seeded exotic species, especially along riparian zones). Typical examples are Valley Bushveld, Mopane bush, and tall Fynbos. Dense bush encroachment areas would be included in this category.

A4.2.1 Thicket

Areas of densely interlaced trees and shrub species (often forming an impenetrable community). Composed of multi-stemmed plants with no clearly definable structure or layers, with > 70% cover. A typical example would be Valley Bushveld.

A4.2.2 Scrub Forest

Vegetation intermediate in structure between true forest and thicket. A multi-layered community with interlocking canopies, with > 70% cover.

A4.2.3 Bushland

Similar to "thicket", but more open in terms of canopy cover levels. Composed of multi-stemmed plants with no definable structure or layers, and with < 70% cover.

A4.2.4 Bush Clumps

Scattered islands of thicket-like vegetation (i.e. > 70% cover) within a matrix of more open bushland or grassland.

A4.2.5 High Fynbos (Heathland)

Fynbos communities between 2 - 5 m in height, > 70% cover, and composed of multi-stemmed evergreen bushes *typically* growing on infertile soils. The Proteaceae family typically dominates.

A4.3. SHRUBLAND & LOW FYNBOS

Communities dominated by **low**, woody, self-supporting, multi-stemmed plants branching at or near the ground, between 0.2 - 2 m in height. Total tree cover < 1.0%. Low shrublands and heathlands are combined at Level 1 due to similar overall physiognomic structure and (in many cases) appearance on remotely sensed imagery. Examples would include low Fynbos, Karoo and Lesotho (alpine) communities.

A4.3.1 Shrubland

Typically broad-leaved or bushes, frequently deciduous. A typical example would be vegetation from the Karoo biomes. Category also includes dwarf succulent shrublands.

A4.3.2 Low Fynbos (Heathland)

Typically small-leaved (i.e. nanophyllous), sclerophyllous, evergreen plants growing on infertile soils. Proteaceae, Ericaceae and Restionaceae frequently dominate.

A4.4. HERBLAND

Communities dominated by **low**, non-woody, self-supporting, non-grass like plants, between 0.2 - 2 m in height. Total tree cover < 1.0%. Typical vegetation examples are found in Namaqualand, and `weed' dominated degraded areas.

A4.5. GRASSLAND

All areas of grassland with less than 10% tree and/or shrub canopy cover, and greater than 0.1% total vegetation cover. Dominated by grass-like, non-woody, rooted herbaceous plants. Typically associated with the Grassland Biome.

A4.5.1 Unimproved Grassland

Essentially indigenous species, growing under natural or semi-natural conditions.

A4.5.2 Improved Grassland

Planted grassland, containing either indigenous or exotic species, growing under man-managed conditions for grazing, hay or turf production, recreation (e.g. golf courses).

A4.6. FOREST PLANTATIONS

All areas of systematically planted, man-managed tree resources, composed of primarily exotic species (including hybrids). Category includes both young and mature plantations that have been established for commercial timber production, seedling trials, and woodlots/windbreaks of sufficient size to be identified on satellite imagery. Unless otherwise stated, Levels 1 & 2 include clear-felled stands *within* plantations. Excludes all non-timber based plantations such as tea and sisal, as well as orchards used in the production of citrus or nut crops. Level 1 category will include associated land-cover/use's such as roads, fire-breaks and building infrastructure if these are too small to be clearly mapped off the satellite imagery.

A4.7. WATERBODIES

Areas of (generally permanent) *open water*. The category includes natural and man-made water bodies, which are either static or flowing, and fresh, brackish and salt-water conditions. This category includes features such as rivers, dams (i.e. reservoirs), permanent pans, lakes, lagoons and coastal waters.

A4.8. WETLANDS

Natural or artificial areas where the water level is at (or very near the land surface) on a permanent or temporary basis, typically covered in either herbaceous or woody vegetation cover. The category includes fresh, brackish and salt-water conditions. Examples include saltmarsh, pans (with non-permanent water cover), reed-marsh or papyrus-swamp and peat bogs.

A4.9. BARREN LANDS

Non-vegetated areas, or areas of very little vegetation cover (excluding agricultural fields with no crop cover, and opencast mines and quarries), where the substrate or soil exposure is clearly apparent.

A4.9.1 Bare Rock / Soil

Natural areas of exposed sand, soil or rock with no, or very little vegetation cover during any time of the year, including rocky outcrops, dunes and gravel plains.

A4.9.2 Degraded Land

Permanent or seasonal, man-induced areas of very low vegetation cover (i.e. removal of tree, bush and/or herbaceous cover) *in comparison to the surrounding natural vegetation cover*. Category includes major erosion scars (i.e. sheet and gully erosion). Should be sub-divided by Level I vegetation classes i.e. **Degraded-Woodland**, and **Degraded-Grassland** wherever possible to allow reconstruction of full class extent. Typically associated with subsistence level farming and rural population centres, where overgrazing of livestock and/or wood-resource removal has been excessive. Often associated with severe soil erosion problems.

A4.10. CULTIVATED LAND

Areas of land that are ploughed and/or prepared for raising crops (excluding timber production). The category includes areas currently under crop, fallow land), and land being prepared for planting. Unless mapping scales allow otherwise, physical class boundaries are broadly defined to encompass the main areas of agricultural activity, and are not defined on exact field boundaries. As such the class may include small inter-field cover types (i.e. hedges, grass strips, small windbreaks etc), as well as farm infrastructure. Subdivided into:

A4.10.1. Subsistence / semi-commercial cultivation: Characterised by numerous small field units in close proximity to rural population centres. Typically dryland crops produced for individual or local (i.e. village) markets. Low level of mechanisation.

A4.10.2. Commercial cultivation: Characterised by large, uniform, well-managed field units, with the aim of supplying both regional, national and export markets. Often highly mechanised.

A4.10.3. Irrigated / Non-irrigated: Major irrigation schemes (i.e. areas supplied with water for agricultural purposes by means of pipes, overhead sprinklers, ditches or streams), are characterised by numerous small farm-scale irrigation dams, close proximity to major water sources and/or centre pivot irrigation systems.

A4.10.4. Permanent crops:

Lands cultivated with crops that occupy the area for long periods and are not replanted after harvest. Examples would include tea plantations, vineyards, sugar cane and citrus orchards, hops and nuts.

A4.10.5. Temporary crops:

Land under temporary crops (i.e. annuals) that are harvested at the completion of the growing season, that remains idle until replanted. Examples would be maize, wheat, legumes, potatoes, onions, and lucerne. Lands cultivated with crops that occupy the area for long periods and are not replanted after harvest. Examples would include tea plantations, vineyards, sugar cane and citrus orchards, hops and nuts.

A4.11. URBAN / BUILT-UP LAND

An area where there is a permanent concentration of people, buildings, and other man-made structures and activities, from large village to city scale. Small rural communities are often included within the surrounding land-cover category (i.e. subsistence / semi-commercial agriculture) if mapping scales do not permit identification of such settlements as individual features. Where mapping scales permit, the limits of the urban boundary are delineated to exclude open areas within the built-up region (i.e. vegetated or non-vegetated areas with few or no structures).

A4.11.1. Residential

Areas in which people reside on a permanent or near-permanent basis. The category includes both *formal* (i.e. permanent structures) and *informal* (i.e. no permanent structures) settlement areas, ranging from high to low building densities, (including smallholdings on the urban fringe).

A4.11.2 Commercial

Non-residential areas used primarily for the conduct of commerce and other mercantile business, typically located in the central business district (CBD).

A4.11.3 Industrial / Transport

Non-residential areas with major industrial (i.e. the manufacture and/or processing of goods or products) or transport related infrastructure. Examples would include power stations, steel mills, dockyards and airports.

A4.12. MINES & QUARRIES

Areas in which mining activity has been done or is being done. Includes both opencast mines and quarries, as well as surface infrastructure, mine dumps etc, associated with underground mining activities.

References:

Fleming, G., 2002. NLC 2000 – Illustrated Field Guide. http://www.csir.co.za/plsql/ptl0002/PTL0002_PGE100_LOOSE_CONTENT?LOOSE_PAGE_NO=7057944, Nov. 2002.

Thompson, M. W., 1995. A Standard Land Cover Classification Scheme for Remote Sensing Applications in South Africa: Illustrated Field Guide. *CSIR research report FOR-I 612, September 1995*. http://www.sac.co.za/geoinfo/field_guide.htm, Oct. 2003.