agriculture,
forestry & fisheries

Department:
Agriculture, Forestry and Fisheries
**REPUBLIC OF SOUTH AFRICA**

# ADDENDUM

# to the

# Terms of Reference

# Forest Resource Assessment
# Pilot Studies

# Buffalo City Metro

**ADDENDUM I**

## BASIC FOREST LAND COVER – STRUCTURAL CLASSIFICATION

| Main Type | 1st Level (canopy density criteria) | 2nd level (canopy height criteria) | Definition |
|---|---|---|---|
| **Natural Wooded Land**<br><br>Any land cover that includes natural perennial woody vegetation of any condition or age; excluding fynbos or karoo scrub | **(Closed canopy / 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. | Contiguous High Forest | >75% canopy cover **X** >20m average tree height |
| | | Contiguous Tall Forest | >75% canopy cover **X** >12m <20m average tree height |
| | | Contiguous Medium Forest | >75% canopy cover **X** >6m <12m average tree height |
| | | Contiguous Low Forest | >75% canopy cover **X** < 2.5m < 6m average tree height |
| | | Contiguous Scrub Forest | >75% canopy cover **X** <2.5m average tree height |
| | **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. | Dense High Forest and Woodland | >35% <75% canopy cover **X** >20m average tree height |
| | | Dense Tall Forest and Woodland | >35% <75% canopy cover **X** >12m <20m average tree height |
| | | Dense Medium Forest and Woodland | >35% <75% canopy cover **X** >6m <12m average tree height |
| | | Dense Low Forest and Woodland | >35% <75% canopy cover **X** >2.5m <6m average tree height |
| | | Dense Scrub Forest and Woodland | >35% <75% canopy cover **X** <2.5m average tree height |
| | **Open Wooded Land** 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. | High Open Wooded Land | >10% -<35% canopy cover X > 20m average tree height |
| | | Tall Open Wooded Land | >10% - <35% canopy cover X > 12m <20m average tree height |
| | | Medium Open Wooded Land | >10% - <35% canopy cover X > 6m <12m average tree height |
| | | Low Open Wooded Land | >10% - <35% canopy cover X > 2.5m <6m average tree height |
| | | Open Woody Scrubland | >10% - <35% canopy cover X <2.5m average tree height |

| Main Type | 1st Level (canopy density criteria) | 2nd level (canopy height criteria) | Definition |
|---|---|---|---|
| **Natural Wooded Land (continued)** | **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. | High Sparsely Wooded Land | >5% -<10% canopy cover X > 20m average tree height |
| | | Tall Sparsely Wooded Land | >5% -<10% canopy cover X > 12m <20m average tree height |
| | | Medium Sparsely Wooded Land | >5% -<10% canopy cover X > 6m <12m average tree height |
| | | Low Sparsely Wooded Land | >5% -<10% canopy cover X > 2.5m <6m average tree height |
| | | Sparsely Wooded Scrubland | >5% -<10% canopy cover X <2.5m average tree height |
| | | | |
| **Planted Forest**<br><br>Tree cover of either indigenous or exotic species that shows evidence of active establishment intervention e.g. in the form of soil preparation, site modification and/or planting<br><br>(excludes fruit orchards and similar perennial food crops) | **Contiguous Planted Forest** > 75% canopy cover | High Contiguous Planted Forest | > 20m average tree height |
| | | Tall Contiguous Planted Forest | 12m- 20m average tree height |
| | | Medium Contiguous Planted Forest | 6m-12m average tree height |
| | | Low Contiguous Planted Forest | 2.5m-6m average tree height |
| | | Contiguous Planted Forest Regeneration | <2.5m average tree height |
| | **Dense Planted Forest** 35% - 75% canopy cover | High Dense Planted Forest | > 20m average tree height |
| | | Tall Dense Planted Forest | 12m- 20m average tree height |
| | | Medium Dense Planted Forest | 6m-12m average tree height |
| | | Low Dense Planted Forest | 2.5m-6m average tree height |
| | | Dense Planted Forest Regeneration | <2.5m average tree height |
| | **Open Planted Forest** (Silvopasture) 10 – 35% canopy cover | High Open Planted Forest | > 20m average tree height |
| | | Tall Open Planted Forest | 12m- 20m average tree height |
| | | Medium Open Planted Forest | 6m-12m average tree height |
| | | Low Open Planted Forest | 2.5m-6m average tree height |
| | | Open Planted Forest Regeneration | <2.5m average tree height |
| | **Sparse Planted Forest** (Silvopasture) 5% - 10% canopy cover | High Sparse Planted Forest | > 20m average tree height |
| | | Tall Sparse Planted Forest | 12m- 20m average tree height |
| | | Medium Sparse Planted Forest | 6m-12m average tree height |
| | | Low Sparse Planted Forest | 2.5m-6m average tree height |
| | | Sparse Planted Forest Regeneration | <2.5m average tree height |

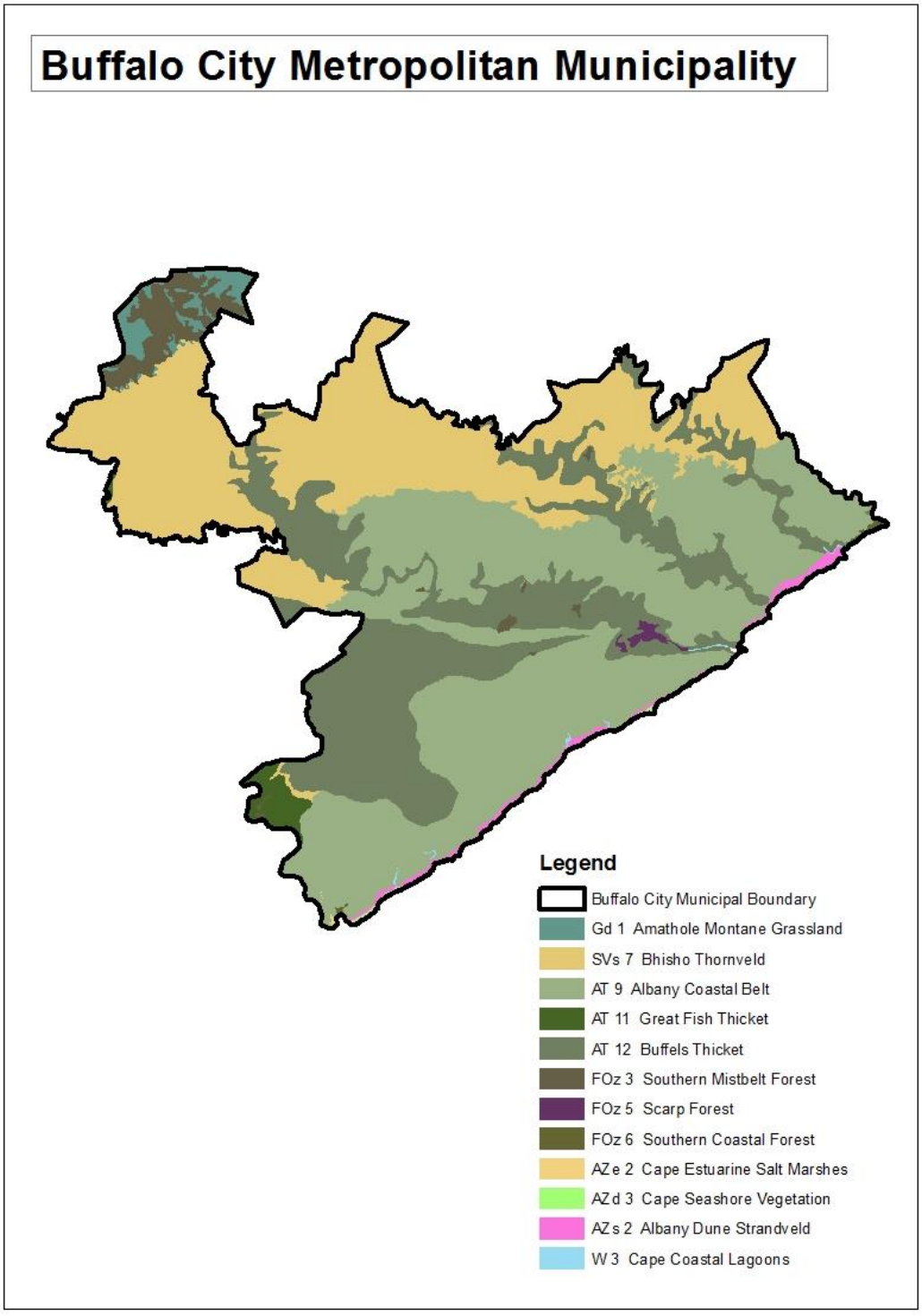
| Main Type | 1st Level (canopy density criteria) | 2nd level (canopy height criteria) | Definition |
|---|---|---|---|
| **Planted Forest** (continued) | **Temporary Unplanted** | Temporary Unplanted | Land cleared of forest cover in process of regeneration (evidenced by large scale clearing of vegetation – preceded by planted forest cover) |
| | **Other Tree Stands** [Mainly mixed spp; multiple age class; irregularly spaced] | Mixed species | |
| | | Other | |
| | | | |
| **Perennial woody crops (Orchards etc)** | **Contiguous** | High | |
| | | Tall | |
| | | Medium | |
| | | Low | |
| | | Shrub / Regeneration | |
| | **Dense** | High | |
| | | Tall | |
| | | Medium | |
| | | Low | |
| | | Shrub / Regeneration | |
| | **Open** | High | |
| | | Tall | |
| | | Medium | |
| | | Low | |
| | | Shrub / Regeneration | |
| | **Sparse** | High | |
| | | Tall | |
| | | Medium | |
| | | Low | |
| | | Shrub /Regeneration | |
| | | | |
| | | | |
| **Invasive woody alien plant stands** | | | This is a problematic land cover class, because it dove-tails with other land cover classes and presents with distinct ambiguity:<br>• It can be a condition rather than land cover of its own:<br>– Sparse pine trees in fynbos<br>– Scattered wattle in grassland<br>• Can be a dominant distinctive land cover class<br>– Blanket Rooikrans (may resemble dune forest)<br>– Clumps of wattle |
| | | | |

**Natural Vegetation Categories not typical-of "Grassland" or "Forest"**

These categories have to be accommodated either under Forest Land or Grassland for climate change reporting purposes – but are not regarded as representative of either in the SA Biome Classification frameworks

| Main Type | 1st Level (canopy density criteria) | 2nd level (canopy height criteria) | Definition |
|---|---|---|---|
| **Fynbos** | | Tall Fynbos | > 1.5m |
| | | Medium Fynbos | > 0.5m ; <1.5m |
| | | Low Fynbos | < 0.5m |
| | | Recently burnt | Fire scar through fynbos vegetation (stand replacement fire disturbance event; i.e. vegetation cleared by fire) |
| | | | |
| **Karoo Scrubland** | | Tall | > 1.5m |
| | | Medium | > 0.5m ; <1.5m |
| | | Low | <.0.5m |
| | | Recently burnt | Fire scar through Karoo vegetation (stand replacement fire disturbance event; i.e. vegetation cleared by fire) |
| **Succulent Karoo** | | | |
| | | | |

## PILOT STUDY AREA - MAP DEPICTING THE FLORISTIC CLASSIFICATION:



## FLORISTIC CLASSIFICATION OF FORESTS / FOREST LAND

### NATURAL WOODED COMPONENT (BUFFALO CITY):

| Main Category | Specific Type | | Reference |
|---|---|---|---|
| Natural Forests | Southern Mistbelt Forest | FO z 3 | VEGMAP |
| | Scarp Forest | FO z 5 | VEGMAP |
| | Southern Coastal Forest | FO z 6 | VEGMAP |
| | Mangrove Forest | FO a 3 | VEGMAP |
| Woodland (Savannah Biome) | Bhisho Thornveld | SV s 7 | VEGMAP |
| Woodland (Other biomes) [Only the wooded elements within] | Amatole Montane Grassland | Gd 1 | VEGMAP |
| | Albany Dune Strandveld | AZ s 2 | VEGMAP |
| Subtropical Thicket Biome | Albany Coastal Belt Thicket | AT 9 | VEGMAP |
| | Great Fish Thicket | AT 11 | VEGMAP |
| | Buffels Thicket | AT 12 | VEGMAP |

### PLANTED AND NATURALISED COMPONENT:

| | | | |
|---|---|---|---|
| Plantations (and other planted forests) | Undifferentiated Plantations | P-u | (new) |
| | Softwood – Pine | P-Sw 1 | (new) |
| | Softwood – Other | P-Sw 2 | (new) |
| | Hardwood – Eucalyptus | P-Hw 1 | (new) |
| | Hardwood – Wattle | P-Hw 2 | (new) |
| | Hardwood – Other | P-Hw 3 | (new) |
| | Mixed Harwood/Softwood | P-HSm | (new) |
| | Bamboo | P-B | (new) |
| | Temporary Unplanted | P-TUP | (new) |
| Other Tree Stands | Invasive Woody Alien Plant Stands (>5% canopy cover) | IWAPS | (new) |
| | Unspecified | | (new) |

## NOTES ON PRIMARY LAND COVER CLASSIFICATION AND MAPPING:

1. Detailed forest land cover classification:

   Two classification frameworks have been provided above for classification of forest land cover. The first is a structure-based approach, primarily using canopy density and stand height criteria. The second is a floristic classification framework, derived from VEGMAP. The objective with the forest resource assessment is to use these classification frameworks in conjunction; giving preference first to the structure based classification for remote sensing purposes and refining the result by applying the VEGMAP classification (wooded types only) by means of GIS. It is known that scale disparities would affect the latter operation; however, it would be part of the objective of this study to explore ways of overcoming these challenges so that a sufficiently accurate and precise result can be obtained. It can be anticipated that the operation of intersecting the two classification systems would result in a large number of categories (and mapped polygons).

   Buffalo City - Albany Thicket example:

   [Structural] X [Floristic] classification

   Albany Thicket:
   [5] X [3] = [15]

| MATRIX: | | Floristic – Sub-tropical Thicket | | |
|---|---|---|---|---|
| Structural | 2nd Level | Albany Coastal Belt Thicket | Great Fish Thicket | Buffels Thicket |
| | Contiguous High | (ha) | (ha) | (ha) |
| | Contiguous Tall | (ha) | (ha) | (ha) |
| | Contiguous Medium | (ha) | (ha) | (ha) |
| | Contiguous Low | (ha) | (ha) | (ha) |
| | Contiguous Scrub | (ha) | (ha) | (ha) |

   Note that whereas only the contiguous structural category has been selected above (1st level), it is possible that degraded forest/thicket may occur in the study areas, in which case the more open structural categories would also apply – as would be the case for all woodland vegetation.

2. Plantations (and other planted or naturalised stands of exotics):

   The undifferentiated category is provided for those areas that are not possible to differentiate into specific species types. This category; although presenting a default option, should preferably be negligible in extent (i.e. all plantations have to be classified correctly into species categories as far as possible).

3. Other Tree Stands:

   Fruit orchards and vineyards are listed here, although they are considered perennial agricultural crops. Species such as prickly pear, banana and papaya are excluded here, because they are not true woody perennials. The objective with inclusion of the mentioned categories is to add utility to the assessment in terms of estimating woody biomass yields that may have value in terms of wood fuel, carbon storage, etc.

4. Invasive Woody Alien Plant Stands

   This is a challenging feature on the landscape for which an effective assessment approach is required. These trees provide resources for use by local communities as well as other ecosystem services; however, they also present an environmental liability of varying degree. Thus it is desirable to include in the assessment. Possible approaches could be:

   - Map as a distinct category – appropriate definitions need to be developed
   - Do not map as a distinct category – rather consider as a form of degradation.

5. Accuracy and mapping resolution

   For the primary remote sensing a high accuracy of mapping is required. For regulatory purposes, reliable spatial data at the scale of 0.1ha is required as a minimum; i.e. mapped polygons should at least reflect forests to this level of accuracy and any forest patches or clearings in forest of this size should be mapped. Therefore geometric resolution (minimum mapping unit) should be 0.1ha and we should strive for a very high percentage of accuracy of > 90%

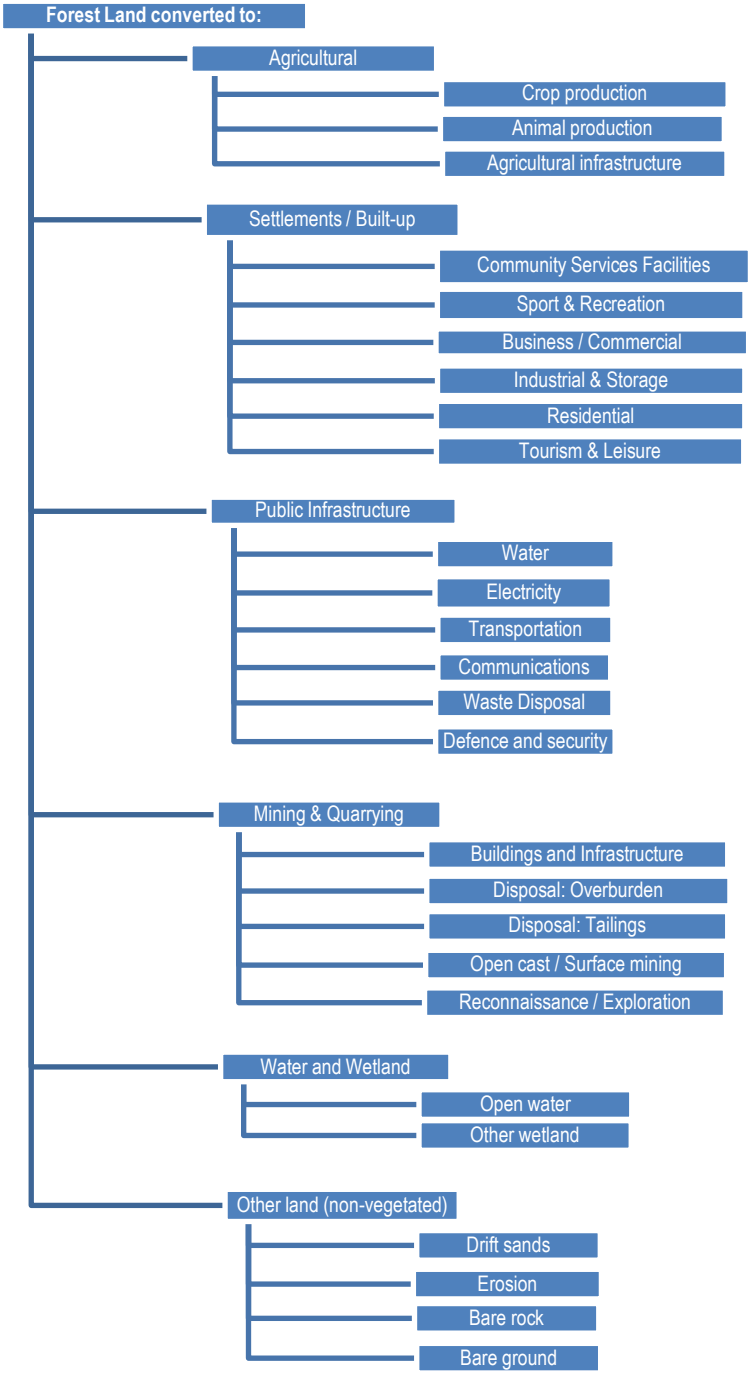
   - For natural forests, available statistics suggest that in some regions as much as 50% of all natural forest patches measure less than 1ha in extent. This emphasise the necessity of mapping natural forests at a fine resolution.
   - Riparian forests often occur as narrow strips along waterways. The proposed minimum mapping unit of 0.1ha would translate to a radial distance from the stream bank of about 32 meter. It would have to be evaluated if this would indeed capture narrow strips of riparian forest – e.g. of the type Lowveld Riverine Forest.
   - Woodland, and perhaps also Albany Thicket, may present rather more as blanket vegetation cover, within which clearings of various sizes would occur. These clearing may form the nuclei of new deforestation and thus has to be mapped accurately
   - For plantations the available statistics are of high accuracy. There may also be small stands of particular interest. Over and above, the mapping resolution for all forest categories have to be consistent and thus the 0.1ha threshold would also apply.
   - It is accepted that some of the spatial data layers that will be applied to the primary remote sensed data, will be of lesser accuracy. Measures may be introduced to improve the final accuracy, although it may still be less than the primary remote sensing data. The result will be that some of the data tables will have a lower accuracy rating than others. For different columns in the different tables it will therefore be necessary to qualify the level of accuracy of the reflected numbers.

# LAND USE LEGEND FOR CLASSIFICATION OF CONVERSION OF FOREST TO NON-FOREST LAND

## IPCC Main Land Categories for LULUCF / AFOLU

| | |
|---|---|
| Forest Land | Settlements |
| Grassland | Wetlands |
| Cropland | Other Land |

## Proposed land use change hierarchy for the NFRA



DEFINITIONS:

| Main Land Use | Land use Sub-categories | Definitions / descriptions |
|---|---|---|
| Agricultural: Crop Production | . | Crop Production refers to the preparing and use of a demarcated area (land) for the planting, improving and harvesting of a specific agricultural vegetative commodity / crop for a specific production purpose / s: |
| | Cultivation - extensive Croplands - annual | All crop fields used for production of annual crops, either dry-land or irrigated; including old lands and fallows. This include grain crops, vegetable crops etc |
| | Cultivation - extensive Croplands - perennial | All plantings of perennial food/agricultural crops (e.g. fruit orchards, vineyards and nut crops) |
| | Intensive Production Systems | Production systems under shade netting and tunnels and associated footprint areas cleared of tree cover |
| Agricultural Animal Production | | Animal production refers to the practices applied for the keeping of animals and includes the raising, feeding, breeding, housing and marketing of the animals within a demarcated / allocated area. |
| | Animal Production - extensive Croplands - pastures | Cultivated land planted with pastures, primarily used for grazing, silage or hey production |
| | Animal Production - extensive Grassland - pasture (natural) | Area of land that is not cultivated, but where tree cover has been removed to retain / promote the natural herbaceous layer - for grazing purposes |
| | Intensive Production Systems | Stables, hen houses, piggeries, feedlots and similar structures / areas and their associated cleared footprint areas; used for animal production systems. |
| | Aquaculture | Ponds for aquaculture production purposes and associated cleared footprint areas |
| Agroforestry | | A collective term for all land-use systems and practices in which woody perennials are deliberately grown (plnated) in the same land management unit as non-woody crops; or managed in conjunction with animal production systems |
| Agricultural Infrastructure | | General Agricultural Infrastructure refers to the physical (actual) infrastructure features required, used or related to the agricultural sector in any manner that are contributing to the advancement, improvement and the preservation of the sector. These include: research, training and administrative facilities. *For this assessment storage and processing facilities, e.g. packing sheds, silos, abattoirs, tanneries, milk processing plants etc. are included under this category. (Or should such be considered under "Settlements" as part of Industry & Storage?)* |

| Main Land Use | Land use Sub-categories | Definitions / descriptions |
|---|---|---|
| Settlements / Built-up: Community Services and Facilities | | Buildings and structures within / associated with built up areas that serve a variety of public utilities of a community; including places of public worship, schools, health care facilities, places of assembly, parks, etc. Transformed footprint areas included. |
| Settlements / Built-up: Sport & Recreation | | Transformed land within / associated with built-up areas, inclusive of any physical infrastructure that serves the purpose of sport and recreation; e.g. stadiums, sports grounds, golf courses, race courses, etc. |
| Settlements / Built-up: Business & Commercial | | Parts of a built up area or defined structures outside predominantly built-up areas in a rural area serving mainly retail and business purposes – all transformed footprint areas included (e.g. parking lots) |
| Settlements / Built-up: Industrial & Storage | | Parts of a built-up area, or defined areas outside predominantly built-up areas that serves purposes of bulk storage of produce or processing and manufacture – inclusive of any associated transformed footprint areas. |
| Settlements / Built-up: Residential | | Built-up land with formal or informal structures of any density and associated footprint areas ("yards"), which are primarily used for and associated with human habitation |
| | Residential – Farm estate | Farmyards, farm worker houses |
| | Residential – Formal (low density) | Lifestyle estates and Smallholdings: the part of a smallholding / estate primarily associated with residence (house, outbuildings and garden); |
| | Residential – Formal Suburban | Suburban built up land primarily used for conventional formal residential purposes (free standing houses and associated yards >700m$^2$) |
| | Residential – Formal (medium density) | Built up land primarily used for higher density residential purposes (free standing or attached) on single stands < 700m$^2$ (e.g. town houses, cluster housing, low-cost regulated housing developments, or self-built low-cost residential areas) |
| | Residential – Formal (high density) | Attached and/or stacked residential complexes, and surrounding shared use terrain ( e.g. flats and associated parking areas and open space) |
| | Residential – Mixed formal and informal | Formal residential areas encroached (within formal stands) with informal housing. |
| | Residential - Informal (dense) | Unregulated crowded settlements of temporary structures outside approved and demarcated (subdivided) township / residential developments (more open start-up informal settlements would also be included) |
| | Residential – Informal (rural) | Self-built homes and associated land holdings typically in areas where tenure is governed under traditional systems |
| Settlements / Built-up Tourism & Leisure | | Built up spaces and associated transformed footprint areas serving temporary accommodation and leisure purposes (e.g. resorts and holiday cottages) |

| Main Land Use | Land use Sub-categories | Definitions / descriptions |
|---|---|---|
| Public Infrastructure | | Land areas transformed and managed for infrastructure related to public utilities; including: power plants; electricity distribution, public roads; railways; water impoundment, water purification, waste disposal, etc. |
| | Water | Land transformed for any water related services; e.g. structures associated with dams and associated water works, reservoirs (closed), canals, water treatment facilities |
| | Electricity | Land transformed and managed for electric power generation and distribution: e.g.: power stations, solar / wind farms, sub-stations, power lines |
| | Transportation | Land transformed and managed for transport infrastructure; e.g.: roads, railways; aviation related; harbours and shipping related. |
| | Communications | Land transformed and managed for communication infrastructure: e.g.: masts and towers (total footprint area included) |
| | Waste disposal | Land transformed and managed for waste disposal, e.g.: incinerators, landfill sites etc |
| | Defence and Security | Land transformed for development and maintenance of defence and security installations, e.g. military camps, air force, shooting ranges etc. |
| Mining & Quarrying | | The visible footprint area transformed by prospecting, extraction, primary processing of deposits and all associated activities as well as the areas transformed by disposal of spoils, tailings and water. |
| | Reconnaissance / Exploration | Areas transformed by exploration for mineral resources and aggregates including access pathways |
| | Open cast / Surface mining | Areas transformed by extraction of mineral resources, including quarries |
| | Disposal - Overburden | Land area transformed and used for disposal of mining spoils and overburden or stock piling of topsoil |
| | Disposal - Tailings | Land area transformed and used for disposal of tailings from mining operations |
| | Disposal - Water | Land area transformed and used for disposal of water from mining operations |
| | Buildings and Infrastructure | All areas occupied by buildings and other structures associated with mining and primary processing of ores. Transformed footprint areas included. |
| Wetlands | | |
| | Open water bodies | Land transformed by inundation seasonally or perennially e.g.: farm (earth) dams; |
| | Other wetlands | Land transformed to become water saturated seasonally or perennially |
| Other land | | Land that became transformed and denuded of vegetation, e.g. bare rock surfaces; erosion scars (gullies or sheet erosion), driftsands, or other bare ground |

## TEMPLATES FOR AREA DATA OUTPUT

Deliverable output tables should be in MS Excel Format and may include more comprehensive spreadsheets of numerical details if that would enhance utility.

The templates included in this Addendum reflect only the classifications for Buffalo City.

EXPLANATORY NOTE:

The data output tables provide a standardised format for reporting the statistics of forest land and change in forest resource base. Two specific aspects of change are reflected; i.e. conversion of forest land to other types of land cover / land use and change in the condition of remaining forest land. Changes in extent of forest cover, according to main conversion categories, are measured relative to the potential natural state as proposed by the VEGMAP. The latter is adopted as reference because of the absence of any reliable and accurately measured early historical land cover reference data. The VEGMAP is also used as basis for classification, serving biodiversity, LULUCF and several other purposes. The approach of tracking changes between land classes corresponds to IPCC Tier II methodology for estimation of Greenhouse Gas Emissions for the land-use sector (LULUCF / AFOLU). Thus it should be possible, from these tables, to identify trends of the following types (as well as any possible reverse conversions):

- Forest Land - Remains Forest Land (same forest type)
- Forest Land - Remains Forest Land (changed to different forest type)
- Forest Land - Converted to Wetlands
- Forest Land - Converted to Crop Farming (annual crops)
- Forest Land - Converted to Crop Farming (perennial crops)
- Forest Land - Converted to Pasture (cultivated pastures – a form of cropland)
- Forest Land - Converted to Grassland (removal of tree cover, no cultivation)
- Forest Land - Converted to other forms of intensive animal husbandry
- Forest Land - Converted to Settlements (residential / industry / amenities)
- Forest Land - Converted to Public Infrastructure (roads, power; etc.)
- Forest Land - Converted to Mining
- Forest Land - Converted to Other Land (bare surfaces e.g. rocks, dunes)

(please refer to the table of IPCC main land types in Addendum 1)

Carbon stocks and emissions profiles differ by land type; tracking conversions thus provide key information for the estimation of changes in carbon stocks and thus for the estimation of greenhouse gas emissions. Changes in the vegetation structure inform estimates of carbon stock. The types of conversions further provide an indication of the relative importance of primary drivers of deforestation.

Besides the objective of deriving estimates of carbon stocks and greenhouse gas emissions from the land conversion data; accurate information about the extent and distribution of forests is fundamental for other aspects of a National Forest Resource Assessment, such as planning for forest inventory. This information, as outputs of the forest resource assessment, also serves a range of utilities in planning and regulation.

**Structure of output data and numbering of tables:**

| | | | | |
|---|---|---|---|---|
| **Section 1** | **Remaining / Extant forest land area** | | | |
| Table | 1 | | | Summary data of remaining / extant forest land |
| | | | | |
| **Section 2** | **Forest land transformed / converted to other land use** | | | |
| Table | 2 | | | Summary data of forest land converted to other land types (Land Use Change) |
| Table* | 2. | A | FOz 3 | Per forest type (e.g. FOz 3; etc) – breakdown of forest land transformed to other land use (main categories) |
| Table* | 2 | B | FOz 3 | Per forest type (e.g. FOz 3; etc) – breakdown of forest land transformed to other land use (detail categories) |
| Table | 2 | C | | Natural wooded land converted to planted forest |
| | | | | |
| **Section 3** | **Forest land expansion: other land converted to forest** | | | |
| Table | 3 | | | Summary data of other land types converted to forest land (forest expansion) |
| Table* | 3 | A | FOz 3 | Per forest type (e.g. FOz 3; etc) – breakdown of main land use categories converted to forest land |
| | | | | |
| **Section 4** | **Structural analysis of extant forest land** | | | |
| Table* | 4 | | FOz 3 | Per forest type (e.g. FOz 3; etc) – breakdown of spatial extend of structural classes |
| | | | | |
| **Section 5** | **Biomass Estimation** | | | |
| Table* | 5 | | FOz 3 | Per forest type (e.g. FOz 3; etc) – estimates of biomass per structural class |
| **Section 6** | **Protected Areas** | | | |
| Table | 6 | | | Summary data on the extent of protected areas |
| Table | 6 | A | | Detail of NEMA Protected Areas |
| Table | 6 | B | | Detail of NFA Protected Areas |
| Table | 6 | C | | Detail of other protected areas |

* Individual table for each forest type in the study area, distinguished by the forest type code at the end of the table number.

**Table 1: SUMMARISED FINDINGS: REMAINING FOREST LAND**

| Natural Wooded Land: | | | | | |
|---|---|---|---|---|---|
| | Area (ha): | VEGMAP | Remaining 2005 | Remaining 2010 | Remaining 2015 |
| **Natural Forests** | | **0.0** | **0.0** | **0.0** | **0.0** |
| FO z 3 | Southern Mistbelt Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 5 | Scarp Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 6 | Southern Coastal Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO a 3 | Mangrove Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Woodland: (All Types)** | | **0.0** | **0.0** | **0.0** | **0.0** |
| **Woodland: Savanna Biome** | | **0.0** | **0.0** | **0.0** | **0.0** |
| SV s 7 | Bisho Thornveld | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Woodland: (Other biomes)** | | **0.0** | **0.0** | **0.0** | **0.0** |
| Gd 1 | Amatole Montane Grassland | 0.0 | 0.0 | 0.0 | 0.0 |
| AZ s 2 | Albany Dune Strandveld | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Subtropical Thicket Biome** | | **0.0** | **0.0** | **0.0** | **0.0** |
| AT 9 | Albany Coastal Belt Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 11 | Great Fish Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 12 | Buffels Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Planted Forest Resources:** | | | | | |
| | Area (ha): | VEGMAP | Remaining 2005 | Remaining 2010 | Remaining 2015 |
| **Plantations** | | **0.0** | **0.0** | **0.0** | **0.0** |
| P-Sw 1 | Softwood – Pine | 0.0 | 0.0 | 0.0 | 0.0 |
| P-Sw 2 | Softwood – Other | 0.0 | 0.0 | 0.0 | 0.0 |
| P-Hw 1 | Hardwood - Eucalyptus | 0.0 | 0.0 | 0.0 | 0.0 |
| P-Hw 2 | Hardwood – Wattle | 0.0 | 0.0 | 0.0 | 0.0 |
| P-Hw 3 | Hardwood – Other | 0.0 | 0.0 | 0.0 | 0.0 |
| P-HSm | Mixed Harwood/Softwood | 0.0 | 0.0 | 0.0 | 0.0 |
| P-B | Bamboo | 0.0 | 0.0 | 0.0 | 0.0 |
| P-u | Undifferentiated Plantations | 0.0 | 0.0 | 0.0 | 0.0 |
| P-TUP | Temporary Unplanted | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Other Wooded Vegetation** | | **0.0** | **0.0** | **0.0** | **0.0** |
| | | 0.0 | 0.0 | 0.0 | 0.0 |

**Note:** Areas per forest type in Table 1 are inclusive of degraded forest land.

**Table 2: SUMMARISED FINDINGS: FOREST LAND TRANSFORMED TO OTHER LAND CLASSES**

| Natural Wooded Land: | | | | | |
|---|---|---|---|---|---|
| | Transformed Area (ha): | 2005 - 2010 | 2010-2015 | VEGMAP - 2005 | VEGMAP - 2015 |
| **Natural Forests** | | **0.0** | **0.0** | **0.0** | **0.0** |
| FO z 3 | Southern Mistbelt Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 5 | Scarp Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 6 | Southern Coastal Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO a 3 | Mangrove Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Woodland: (All Types)** | | **0.0** | **0.0** | **0.0** | **0.0** |
| **Woodland: Savanna Biome** | | **0.0** | **0.0** | **0.0** | **0.0** |
| SV s 7 | Bisho Thornveld | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Woodland: (Other biomes)** | | **0.0** | **0.0** | **0.0** | **0.0** |
| Gd 1 | Amatole Montane Grassland | 0.0 | 0.0 | 0.0 | 0.0 |
| AZ s 2 | Albany Dune Strandveld | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Subtropical Thicket Biome** | | **0.0** | **0.0** | **0.0** | **0.0** |
| AT 9 | Albany Coastal Belt Thicket | 0.0 | 0.0 | | 0.0 |
| AT 11 | Great Fish Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 12 | Buffels Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Planted Forest Resources:** | | | | | |
| | Transformed Area (ha): | 2005 - 2010 | 2010-2015 | VEGMAP - 2005 | VEGMAP - 2015 |
| **Plantations** | | **0.0** | **0.0** | **0.0** | **0.0** |
| P-Sw 1 | Softwood – Pine | 0.0 | 0.0 | 0.0 | 0.0 |
| P-Sw 2 | Softwood – Other | 0.0 | 0.0 | 0.0 | 0.0 |
| P-Hw 1 | Hardwood - Eucalyptus | 0.0 | 0.0 | 0.0 | 0.0 |
| P-Hw 2 | Hardwood – Wattle | 0.0 | 0.0 | 0.0 | 0.0 |
| P-Hw 3 | Hardwood – Other | 0.0 | 0.0 | 0.0 | 0.0 |
| P-HSm | Mixed Harwood/Softwood | 0.0 | 0.0 | 0.0 | 0.0 |
| P-B | Bamboo | 0.0 | 0.0 | 0.0 | 0.0 |
| P-u | Undifferentiated Plantations | 0.0 | 0.0 | 0.0 | 0.0 |
| P-TUP | Temporary Unplanted | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Other Tree Stands** | | **0.0** | **0.0** | **0.0** | **0.0** |
| | | 0.0 | 0.0 | 0.0 | 0.0 |

**Table 2 A [*Type – e.g. FOz 3 ]: FOREST LAND TRANSFORMED TO OTHER LAND CLASSES**

| Main Forest Resource Category (e.g. Natural Forests;) | Type 1 (Specific type as per Addendum I) | | | | VEGMAP Area: (ha) | | |
|---|---|---|---|---|---|---|---|
| **Transformation classes (Land-use change)** | Area (ha) (2005) | Area (ha) (2010) | Area (ha) (2015) | Change in area 2005 – 2010(ha) | Change in area 2010 – 2015 (ha) | Change in Area 2005 : VEGMAP (ha) | Change in Area 2015 : VEGMAP (ha) |
| Agric Crop Production (Annual field crops) | | | | | | | |
| Agric Crop Production (Perennial crops) | | | | | | | |
| Agric Crop Production (Intensive systems) | | | | | | | |
| Agric Animal Production (Planted pasture) | | | | | | | |
| Agric Animal Production (Natural grazing) | | | | | | | |
| Agric Animal Production ( Intensive systems) | | | | | | | |
| Agric Animal Production (Aquaculture) | | | | | | | |
| Agric Infrastructure | | | | | | | |
| Agricultural (Total): | | | | | | | |
| | | | | | | | |
| Settlements – Community Services | | | | | | | |
| Settlements – Sport & Recreation | | | | | | | |
| Settlements – Business & Commercial | | | | | | | |
| Settlements – Industrial & Storage | | | | | | | |
| Settlements – Residential | | | | | | | |
| Settlements – Tourism | | | | | | | |
| Settlements (Total): | | | | | | | |
| | | | | | | | |
| Infrastructure – Water | | | | | | | |
| Infrastructure – Electricity | | | | | | | |
| Infrastructure – Transportation | | | | | | | |
| Infrastructure – Communications | | | | | | | |
| Infrastructure – Waste Management | | | | | | | |
| Infrastructure – Defence, Safety & Security | | | | | | | |
| Infrastructure (Total): | | | | | | | |
| | | | | | | | |

| Transformation classes (Land-use change) | Area (ha) (2005) | Area (ha) (2010) | Area (ha) (2010) | Change in area 2005 – 2010 (ha) | Change in area 2010 – 2015 (ha) | Change in Area 2005 : VEGMAP (ha) | Change in Area 2015 : VEGMAP (ha) |
|---|---|---|---|---|---|---|---|
| Mining – Exploration | | | | | | | |
| Mining – Open cast / Surface operations | | | | | | | |
| Mining – Disposal (Overburden) | | | | | | | |
| Mining – Disposal (Tailings) | | | | | | | |
| Mining – Disposal (Water) | | | | | | | |
| Mining – Buildings & Infrastructure | | | | | | | |
| Mining & Quarrying (Total): | | | | | | | |
| | | | | | | | |
| Water & Wetlands – Open Water | | | | | | | |
| Water & Wetlands – Wetlands | | | | | | | |
| Water & Wetlands (Total): | | | | | | | |
| | | | | | | | |
| Other Land – Drift sands | | | | | | | |
| Other Land – Erosion | | | | | | | |
| Other Land – Bare ground | | | | | | | |
| Other Land – Bare Rock | | | | | | | |
| Other Land (Total): | | | | | | | |
| | | | | | | | |
| **Total Area of Conversion:** | 0.0 | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** | **0.0** |

**Table 2 B [*Type – e.g. FOz 3 ]: FOREST LAND TRANSFORMED TO RESIDENTIAL – DETAIL ANALYSIS**

| Main Forest Resource Category (e.g. Natural Forests;) | | | | Type 1 (Specific type as per Addendum I) | | | |
|---|---|---|---|---|---|---|---|
| **Transformation classes (Land-use change)** | Area (ha) (2005) | Area (ha) (2010) | Area (ha) (2015) | Change in area 2005 – 2010 (ha) | Change in area 2010 – 2015 (ha) | Change in Area 2005 : VEGMAP (ha) | Change in Area 2015 : VEGMAP (ha) |
| Residential – Farm estate | | | | | | | |
| Residential – Formal (low density) | | | | | | | |
| Residential – Formal Suburban | | | | | | | |
| Residential – Formal (medium density) | | | | | | | |
| Residential – Formal (high density) | | | | | | | |
| Residential – Mixed formal and informal | | | | | | | |
| Residential - Informal (dense) | | | | | | | |
| Residential – Informal (rural) | | | | | | | |
| **Total:** | | | | | | | |

**Table 2 C-1: NATURAL WOODED LAND TRANSFORMED TO PLANTED FOREST – DETAIL ANALYSIS**

| Natural Wooded Land: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Transformed Area (ha): | | Softwood | Hardwood | Mixed | Bamboo | Undiff. | TUP | EXIT |
| **Natural Forests** | | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** |
| FO z 3 | Southern Mistbelt Forest | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 5 | Scarp Forest | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 6 | Southern Coastal Forest | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| FO a 3 | Mangrove Forest | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | |
| **Woodland: (All Types)** | | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** |
| **Woodland: Savanna Biome** | | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** |
| SV s 7 | Bisho Thornveld | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | |
| **Woodland: (Other biomes)** | | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** |
| Gd 1 | Amatole Montane Grassland | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AZ s 2 | Albany Dune Strandveld | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | |
| **Subtropical Thicket Biome** | | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** |
| AT 9 | Albany Coastal Belt Thicket | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 11 | Great Fish Thicket | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 12 | Buffels Thicket | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | |

**Note:** The "EXIT" category refers to plantation areas withdrawn from production as part of the commercial forestry exit strategy or areas cleared as part of invasive control eradication programmes.

**Table 3: SUMMARISED FINDINGS: OTHER LAND CLASSES CONVERTED TO FOREST (FOREST LAND EXPANSION)**

| Natural Wooded Land: | | | | VEGMAP | VEGMAP |
|---|---|---|---|---|---|
| Area (ha): | | 2005-2010 | 2010-2015 | 2005 | 2015 |
| **Natural Forests** | | **0.0** | **0.0** | **0.0** | **0.0** |
| FO z 3 | Southern Mistbelt Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 5 | Scarp Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 6 | Southern Coastal Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO a 3 | Mangrove Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Woodland: (All Types)** | | **0.0** | **0.0** | **0.0** | **0.0** |
| **Woodland: Savanna Biome** | | **0.0** | **0.0** | **0.0** | **0.0** |
| SV s 7 | Bisho Thornveld | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Woodland: (Other biomes)** | | **0.0** | **0.0** | **0.0** | **0.0** |
| Gd 1 | Amatole Montane Grassland | 0.0 | 0.0 | 0.0 | 0.0 |
| AZ s 2 | Albany Dune Strandveld | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Subtropical Thicket Biome** | | **0.0** | **0.0** | **0.0** | **0.0** |
| AT 9 | Albany Coastal Belt Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 11 | Great Fish Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 12 | Buffels Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Planted Forest Resources:** | | | | **VEGMAP** | **VEGMAP** |
| Area (ha): | | 2005-2010 | 2010-2015 | 2005 | 2015 |
| **Plantations** | | **0.0** | **0.0** | **0.0** | **0.0** |
| P-Sw 1 | Softwood – Pine | 0.0 | 0.0 | 0.0 | 0.0 |
| P-Sw 2 | Softwood – Other | 0.0 | 0.0 | 0.0 | 0.0 |
| P-Hw 1 | Hardwood - Eucalyptus | 0.0 | 0.0 | 0.0 | 0.0 |
| P-Hw 2 | Hardwood – Wattle | 0.0 | 0.0 | 0.0 | 0.0 |
| P-Hw 3 | Hardwood – Other | 0.0 | 0.0 | 0.0 | 0.0 |
| P-HSm | Mixed Harwood/Softwood | 0.0 | 0.0 | 0.0 | 0.0 |
| P-B | Bamboo | 0.0 | 0.0 | 0.0 | 0.0 |
| P-u | Undifferentiated Plantations | 0.0 | 0.0 | 0.0 | 0.0 |
| P-TUP | Temporary Unplanted | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Other Tree Stands** | | **0.0** | **0.0** | **0.0** | **0.0** |
| | | 0.0 | 0.0 | 0.0 | 0.0 |

**Note:** Areas per forest type are inclusive of forest land in early successional stages.

**Table 3 A [*Type – e.g. FOz 3 ]: OTHER LAND CLASSES CONVERTED TO FOREST LAND**

| Main Forest Resource Category (e.g. Natural Forests;) | | Type 1 (Specific type as per Addendum I) | | | VEGMAP Area: (ha) | |
|---|---|---|---|---|---|---|
| **Transformation classes** | Area (ha) (2005) | Area (ha) (2010) | Area (ha) (2015) | Area expansion 2005 – 2010 (ha) | Area expansion 2010 – 2015 (ha) | Net Expansion 2005 - 2015 (ha) |
| Agric Crop Production (Annual field crops) | | | | | | |
| Agric Crop Production (Perennial crops) | | | | | | |
| Agric Crop Production (Intensive systems) | | | | | | |
| Agric Animal Production (Planted pasture) | | | | | | |
| Agric Animal Production (Natural grazing) | | | | | | |
| Agric Animal Production ( Intensive systems) | | | | | | |
| Agric Animal Production (Aquaculture) | | | | | | |
| Agric Infrastructure | | | | | | |
| Agricultural (Total): | | | | | | |
| | | | | | | |
| Settlements – Community Services | | | | | | |
| Settlements – Sport & Recreation | | | | | | |
| Settlements – Business & Commercial | | | | | | |
| Settlements – Industrial & Storage | | | | | | |
| Settlements – Residential | | | | | | |
| Settlements – Tourism | | | | | | |
| Settlements (Total): | | | | | | |
| | | | | | | |
| Infrastructure – Water | | | | | | |
| Infrastructure – Electricity | | | | | | |
| Infrastructure – Transportation | | | | | | |
| Infrastructure – Communications | | | | | | |
| Infrastructure – Waste Management | | | | | | |
| Infrastructure – Defence, Safety & Security | | | | | | |
| Infrastructure (Total): | | | | | | |
| | | | | | | |

| Transformation classes (Land-use change) | Area (ha) (2005) | Area (ha) (2010) | Area (ha) (2015) | Change in area 2005 – 2010 (ha) | Change in area 2010 – 2015 (ha) | Change in Area 2015 : VEGMAP (ha) |
|---|---|---|---|---|---|---|
| Mining – Exploration | | | | | | |
| Mining – Open cast / Surface operations | | | | | | |
| Mining – Disposal (Overburden) | | | | | | |
| Mining – Disposal (Tailings) | | | | | | |
| Mining – Disposal (Water) | | | | | | |
| Mining – Buildings & Infrastructure | | | | | | |
| Mining & Quarrying (Total): | | | | | | |
| | | | | | | |
| Water & Wetlands – Open Water | | | | | | |
| Water & Wetlands – Wetlands | | | | | | |
| Water & Wetlands (Total): | | | | | | |
| | | | | | | |
| Other Land – Drift sands | | | | | | |
| Other Land – Erosion | | | | | | |
| Other Land – Bare ground | | | | | | |
| Other Land – Bare Rock | | | | | | |
| Other Land (Total): | | | | | | |
| | | | | | | |
| **Total Area of Conversion:** | 0.0 | 0.0 | 0.0 | **0.0** | **0.0** | **0.0** |

**Note:** Forest expansion could be assumed to represent the relevant VEGMAP type modelled for the particular area. However, there is no conclusive argument at this stage to assert that this is necessarily true. It is proposed that the most reliable statement that can be made about forest expansion at this stage - especially on land previously disturbed by cultivation, is that it is either natural or planted.

**Table 4 [*Type – e.g. FOz 3 ]:STRUCTURAL PROFILE OF EXTANT FOREST LAND PER FOREST TYPE**

| Main Forest Resource Category (e.g. Natural Forest / Woodland / Plantation) | | | | Type 1 (Specific floristic type as per Addendum I) | |
|---|---|---|---|---|---|
| **Structural classes** | Area (ha) (2005) | Area (ha) (2010) | Area (ha) (2015) | Change in area 2005 – 2010 (ha) | Change in area 2010 – 2015 (ha) |
| Contiguous | | | | | |
| High | | | | | |
| Tall | | | | | |
| Medium | | | | | |
| Low | | | | | |
| Scrub | | | | | |
| | | | | | |
| Dense | | | | | |
| High | | | | | |
| Tall | | | | | |
| Medium | | | | | |
| Low | | | | | |
| Scrub | | | | | |
| | | | | | |
| Open | | | | | |
| High | | | | | |
| Tall | | | | | |
| Medium | | | | | |
| Low | | | | | |
| Scrub | | | | | |
| | | | | | |
| Sparsely Wooded | | | | | |
| High | | | | | |
| Tall | | | | | |
| Medium | | | | | |
| Low | | | | | |
| Scrub | | | | | |
| | | | | | |
| **Total Area:** | 0.0 | 0.0 | 0.0 | **0.0** | **0.0** |

**Note:** (1) In the case of natural forests, the categories: "Dense", "Open" and "Sparsely Wooded" may indeed occur on the ground; in which case we are dealing with a form degraded natural forest

(2) In the case of woodland, the contiguous category may indeed occur on the ground, in which case we may be dealing with encroached woodland – depending on the specific woodland type.

**Table 5 [*Type – e.g. FOz 3 ]: ESTIMATION OF BIOMASS FROM REMOTE SENSING PER FOREST TYPE**

[*This work is optional to the main project*]

| Main Forest Resource Category (e.g. Natural Forest / Woodland / Plantation) | | | | Type 1 (Specific floristic type as per Addendum I) | |
|---|---|---|---|---|---|
| **Structural classes** | Mass (Mg) (2005) | Mass (Mg) (2010) | Mass (Mg) (2015) | Change 2005 – 2010 Mass (Mg) | Change 2010 – 2015 Mass (Mg) |
| Contiguous | | | | | |
| High | | | | | |
| Tall | | | | | |
| Medium | | | | | |
| Low | | | | | |
| Scrub | | | | | |
| | | | | | |
| Dense | | | | | |
| High | | | | | |
| Tall | | | | | |
| Medium | | | | | |
| Low | | | | | |
| Scrub | | | | | |
| | | | | | |
| Open | | | | | |
| High | | | | | |
| Tall | | | | | |
| Medium | | | | | |
| Low | | | | | |
| Scrub | | | | | |
| | | | | | |
| Sparsely Wooded | | | | | |
| High | | | | | |
| Tall | | | | | |
| Medium | | | | | |
| Low | | | | | |
| Scrub | | | | | |
| | | | | | |
| **Total Mass:** | 0.0 | 0.0 | 0.0 | **0.0** | **0.0** |

**Table 6: SUMMARISED FINDINGS: EXTENT OF PROTECTED REMAINING FOREST LAND**

| Natural Wooded Land: | | | | |
|---|---|---|---|---|
| | Area (ha): | Protected 2005 | Protected 2010 | Protected 2015 |
| **Natural Forests** | | **0.0** | **0.0** | **0.0** |
| FO z 3 | Southern Mistbelt Forest | 0.0 | 0.0 | 0.0 |
| FO z 5 | Scarp Forest | 0.0 | 0.0 | 0.0 |
| FO z 6 | Southern Coastal Forest | 0.0 | 0.0 | 0.0 |
| FO a 3 | Mangrove Forest | 0.0 | 0.0 | 0.0 |
| | | | | |
| **Woodland: (All Types)** | | **0.0** | **0.0** | **0.0** |
| **Woodland: Savanna Biome** | | **0.0** | **0.0** | **0.0** |
| SV s 7 | Bisho Thornveld | 0.0 | 0.0 | 0.0 |
| | | | | |
| **Woodland: (Other biomes)** | | **0.0** | **0.0** | **0.0** |
| Gd 1 | Amatole Montane Grassland | 0.0 | 0.0 | 0.0 |
| AZ s 2 | Albany Dune Strandveld | 0.0 | 0.0 | 0.0 |
| | | | | |
| **Subtropical Thicket Biome** | | **0.0** | **0.0** | **0.0** |
| AT 9 | Albany Coastal Belt Thicket | 0.0 | 0.0 | 0.0 |
| AT 11 | Great Fish Thicket | 0.0 | 0.0 | 0.0 |
| AT 12 | Buffels Thicket | 0.0 | 0.0 | 0.0 |
| | | | | |

**Table 6 A: EXTENT OF PROTECTED REMAINING FOREST LAND (2015)**

**PER TYPE OF PROTECTED AREA (NEMA SECTION 9(a))**

| Natural Wooded Land: | | | | | |
|---|---|---|---|---|---|
| Area (ha): | | National Park | Nature Reserve (National) | Nature Reserve (Provincial) | Protected Environment |
| **Natural Forests** | | **0.0** | **0.0** | **0.0** | **0.0** |
| FO z 3 | Southern Mistbelt Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 5 | Scarp Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 6 | Southern Coastal Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO a 3 | Mangrove Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Woodland: (All Types)** | | **0.0** | **0.0** | **0.0** | **0.0** |
| **Woodland: Savanna Biome** | | **0.0** | **0.0** | **0.0** | **0.0** |
| SV s 7 | Bisho Thornveld | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Woodland: (Other biomes)** | | **0.0** | **0.0** | **0.0** | **0.0** |
| Gd 1 | Amatole Montane Grassland | 0.0 | 0.0 | 0.0 | 0.0 |
| AZ s 2 | Albany Dune Strandveld | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Subtropical Thicket Biome** | | **0.0** | **0.0** | **0.0** | **0.0** |
| AT 9 | Albany Coastal Belt Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 11 | Great Fish Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 12 | Buffels Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |

**Table 6 B: EXTENT OF PROTECTED REMAINING FOREST LAND (2015)**

**PER TYPE OF PROTECTED AREA - NATIONAL FORESTS ACT**

| Natural Wooded Land: | | | | | |
|---|---|---|---|---|---|
| | Area (ha): | Forest Nature Reserve | Forest Wilderness Area) | Protected Woodland* | State Forest* |
| **Natural Forests** | | **0.0** | **0.0** | **0.0** | **0.0** |
| FO z 3 | Southern Mistbelt Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 5 | Scarp Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 6 | Southern Coastal Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO a 3 | Mangrove Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Woodland: (All Types)** | | **0.0** | **0.0** | **0.0** | **0.0** |
| **Woodland: Savanna Biome** | | **0.0** | **0.0** | | **0.0** |
| SV s 7 | Bisho Thornveld | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Woodland: (Other biomes)** | | **0.0** | **0.0** | **0.0** | **0.0** |
| Gd 1 | Amatole Montane Grassland | 0.0 | 0.0 | 0.0 | 0.0 |
| AZ s 2 | Albany Dune Strandveld | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Subtropical Thicket Biome** | | **0.0** | **0.0** | **0.0** | **0.0** |
| AT 9 | Albany Coastal Belt Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 11 | Great Fish Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 12 | Buffels Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |

Note: Protected Woodlands and State Forests are not regarded as Protected Areas in terms of NEMA

## Table 6 C: EXTENT OF PROTECTED REMAINING FOREST LAND (2015)

### PER TYPE OF PROTECTED AREA - OTHER

| Natural Wooded Land: | | | | | |
|---|---|---|---|---|---|
| Area (ha): | | World Heritage Areas | Mountain Catchment Areas Act | | |
| **Natural Forests** | | **0.0** | **0.0** | **0.0** | **0.0** |
| FO z 3 | Southern Mistbelt Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 5 | Scarp Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO z 6 | Southern Coastal Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| FO a 3 | Mangrove Forest | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Woodland: (All Types)** | | **0.0** | **0.0** | **0.0** | **0.0** |
| **Woodland: Savanna Biome** | | **0.0** | **0.0** | | **0.0** |
| SV s 7 | Bisho Thornveld | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Woodland: (Other biomes)** | | **0.0** | **0.0** | **0.0** | **0.0** |
| Gd 1 | Amatole Montane Grassland | 0.0 | 0.0 | 0.0 | 0.0 |
| AZ s 2 | Albany Dune Strandveld | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |
| **Subtropical Thicket Biome** | | **0.0** | **0.0** | **0.0** | **0.0** |
| AT 9 | Albany Coastal Belt Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 11 | Great Fish Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| AT 12 | Buffels Thicket | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | |

**ADDENDUM III**

## OUTLINE OF FINAL REPORT

| Main Part | Subject / Headings | Content |
|---|---|---|
| Front | Front Cover;<br>Title Page | Title; date; main authors / editors;<br>DAFF logo / PSP Company name & logo |
| | Table of Contents,<br>List of Figures, Acronyms, etc | Include glossary of acronyms / symbols |
| Introductory | Executive Summary | 2 page maximum |
| | Introduction | Purpose / Background / Context |
| | Approach and methodology | Summary narrative – maximum 1 page |
| Main Body: *Municipal Area and Forest Resource Information* | Municipal Area | Summary narrative and statistics of the Municipal area: climate; topography (elevation); geology and soils; (population statistics and main economic activities may be mentioned) |
| | Forest Resource | Concise narrative discussion of main categories and forest-types with key statistics and trends emerging from the analysis<br>Summary tables of key statistics.<br>A4 – size colour map showing all main forest resource categories as per classification used in the report<br>*(More detailed maps in A3 / A2 size should be bound into the addendum section of the Report)* |
| Comment | Discussion, Recommendations and Conclusion | Feedback on the Terms of Reference, Reporting Format and Methodology (specific comment on adaptations required for up-scaling this work to a provincial and national remote sensing project) |
| References | Bibliography | Bibliography of all publications referenced<br>Data sources and meta data (non-spatial) |
| Addendum | Methods of Data Generation and Analysis | Full description of approach and methodology (include flow-charts), sampling protocols, data management and analysis.<br>Accuracy Assessment Report<br>Conversion Tables and Formulae |
| | Maps | A3 / A2 size maps<br>• Climate map of the municipal area (main climate types)<br>• Elevation map<br>• Soil type map<br>• Forest resource maps<br>(note more details below / next page) |
| | Forest Resource Statistics | Numerical Information:<br>Data tables as per ToR Addendum II |
| | Metadata (Spatial Data) | Refer to Addendum IV of the ToR |

**Specifications for Maps to be included in the bound report**:

Map 1.1. Climate

Map 1. 2. Elevation

Map 1.3. Soil types

Map 2.1 Forest Resources – 2005; 2010 and 2015 (summary)
[this map corresponds to Table 1]

Map 2.2 Forest Resources - 2005; 2010 and 2015 (natural forests)

Map 2.3 Forest Resources - 2005; 2010 and 2015 (woodlands and thicket)

Map 2.4 Forest Resources - 2005; 2010 and 2015 (plantations)

Map 3 Forest Resources (Deforestation 2005-2010; 2010-2015 i.e.: areas lost for long term / permanent)
[this map corresponds to Table 2]

Map 3.1 Forest Resources (Deforestation 2005-2010; 2010-2015 Conversion to Agricultural land use)

Map 3 2 Forest Resources (Deforestation 2005-2010; 2010-2015 Conversion to Settlement and Infrastructure)

Map 3 3 Forest Resources (Deforestation 2005-2010; 2010-2015 Conversion to Mining)

Map 4 Forest Expansion - 2005-2010; 2010-2015
[this map corresponds to Table 3]

Map 5 Forest Structure – 2005; 2010; 2015
(canopy density and height - not differentiated to floristic forest type)
[this map corresponds to Table 4]

Map 6 Forest Land Protected - 2015
[this map corresponds to Table 6 – incorporating details as per Tables 6A – 6C (differentiated in the map legend)]

# DATA SPECIFICATIONS AND DATA INPUTS PROVIDED BY THE DEPARTMENT

## SPATIAL DATA STANDARDS

### Projections:

- Preferred: Geographic Coordinates (decimal degrees) WGS84
- Alternative: Universal Transverse Mercator (UTM), WGS84 (meters)

### Data Formats:

- DEM Terrain Data
- Digital Raster Data – ERDAS Imagine, TIFF, JPEG, other raster formats
- Vector data – GIS shapefiles
- Any applied spatial cleaning techniques – when converting raster to vector (to be specified in the report)

### Data acquisition and data management

| Data Set / Image | Acquisition date | Image date (overpass) | Resolution | Accuracy |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

### Meta data summary information

| Data Set (Summary info) | Date of creation | Data Custodian | Description |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## Standard for Reporting Metadata (SANS 1878):

As an addendum to the project report, metadata must be provided for each spatial data layer used according to the SANS 1878 standard. The following is required:

**Dataset title**:

**Dataset reference date:**

**Data quality:**

**Dataset responsible party:**

**Geographic location of the dataset:**

Xmin:
Xmax:
Ymin: -
Ymax: -

**Spatial Representation Type:**

Projection coordinates based on

**Dataset language:**

**Dataset character set:**

**Dataset topic category:**

**Scale of dataset:**

**Keywords:**

**Abstract describing dataset:**

**Dataset format name:**

**Dataset format version:**

**Additional extent information for the dataset:**

**Vertical Extent:**

Minimum Value:
Maximum Value:
Unit Of Measure:

**Vertical Datum:**

**Temporal Extent:**

**Reference system:**

**CRS:**

Projection used:
Ellipsoid used:
Datum used:

**Ellipsoid parameters:**

Ellipsoid semi major axis:
Axis units:
Denominator flattening ratio:

**Projection parameters:**

Zone:
Standard parallel:
Longitude of central meridian:
Latitude of projection origin:
False easting:
False northing:
Scale factor at equator:
Projection units: decimal degrees

**Linage statement:**

**Online resource:**

**Metadata file identifier:**

**Metadata standard name:**

**Metadata standard version:**

**Metadata language:**

**Metadata character set:**

**Metadata point of contact:**

**Publication Date:**

Name:
Organisation Name:
**Postal address**
**Physical address**
**Telephone:**

**Metadata time stamp:**

**Attributes –**

**Data maintenance and update frequency:**

**Distribution and constraints:**

## IMAGERY AVAILABLE TO SERVICE PROVIDERS

The Department will provide the following spatial data to the service provider, if required:

| Product | Spectral Range | Resolution | Reference year 2005 | Reference year 2010 | Reference year 2015 |
|---|---|---|---|---|---|
| SPOT 5 | RGB | 2.5m | 2006 | 2010 | 2015 |
| LANDSAT 7 ETM | RGB | 30 m | 2005 | 2010 | |
| LANDSAT 7 ETM | NIR | 30 m | 2005 | 2010 | |
| Aerial Photography | Colour | 0.5m | - | 2008/2009/ 2010 | |

The provision of this data will be subject to limitations of licence conditions. Copyright, further distribution and future use of the data will be restricted.

## ACCURACY ASSESSMENT REPORT

The objective of this report is to provide users of this study with an indication of the measure of error reasonably expected to be associated with the numerical values presented as well as resolution and accuracy of the maps and spatial raw data. This report also explains the sources of error and the mitigation measures that were employed to improve accuracy. As per the requirement of the Terms of Reference this report explains how accuracy was measured and how the level of accuracy of the study results informs any future use or application of the findings.

Accuracies should be reported using industry standard error (confusion) matrices, and include Producer, User and Kappa values.

## INPUT DATA LIMITATIONS

[This component deals with matters of scale and resolution, seasonality, heterogeneity etc.]

**Imagery (Raster):**

**Spatial raw data (Vector):**

**Other input data:**

## SOURCES OF ERROR - DATA ANALYSIS

## MITIGATION MEASURES

## FINDINGS OF FIELD VERIFICATION

**Sampling:**

**Results:**

## MITIGATION MEASURES

## OVER-ALL ASSESSMENT OF ACCURACY