

Critical Biodiversity Areas Mapbook for the Ba-Phalaborwa Municipality 2019

Supporting land use planning and decision-making in
Critical Biodiversity Areas and Ecological Support Areas
for sustainable development

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About the Critical Biodiversity Areas (CBA) Mapbook

This CBA Mapbook is associated with the [Biodiversity Sector Plan \(BSP\) Handbook](#) compiled for the Ba-Phalaborwa Municipality. Central to the BSP is the Critical Biodiversity Area (CBA) Map.

Purpose of the CBA Mapbook

This Mapbook zooms into the municipal area allowing for non-GIS users to interrogate the CBA Map categories and biodiversity features on a particular cadastral (property). Adjacent to each CBA Map portion, is the National South African vegetation map (Mucina and Rutherford, 2006, amended 2012). The mapbook can be used by all sectors and professionals involved in land use planning and decision-making, including non-governmental organizations and the public.

CBA Mapbook Compiled by

The CBA Mapbook has been compiled in conjunction with the Ba-Phalaborwa Municipality BSP handbook and associated CBA Map. The information was prepared by the Association for Water and Rural Development (AWARD) as part of the RESILIM-O Project (Resilience in the Limpopo River Basin- Olifants Catchment Program). The project is funded by the United States Agency for International Development (USAID). AWARD Contacts - Tel: 015 793 0503 / 0145; Email: info@award.org.za; Website: www.award.org.za.

CBA Map Compiled By

The CBA Map for the Municipality was produced through a systematic biodiversity planning process conducted at a fine-scale (1:50 000), as part of the Mopani District Bioregional Plan 2016, which was developed by the Limpopo Department of Economic Development, Environment and Tourism (LEDET). It was further updated in terms of (i) land cover, with associated CBA Map classification; and (ii) Protected Areas data in order to develop Ba-Phalaborwa CBA map (referred to the BSP Handbook for a detailed explanation).

The GIS maps that form part of the CBA Map include:

Primary data:

Critical Biodiversity Areas Map (includes all CBA Map categories: Protected Areas, Critical Biodiversity Areas, Ecological Support Areas, Other Natural Areas and No Natural Remaining, including Conservation Areas).

- Contact the Association for Water and Rural Development (AWARD) (contact details above).

Associated data:

South African vegetation types (2012), wetlands, key rivers, land cover.

- Users can download vegetation, river and wetland data from the SANBI BGIS website (<http://bgis.sanbi.org/SpatialDataset>).
- Users can download the DEA land cover data and protected areas layer from the DEA website: https://egis.environment.gov.za/national_land_cover_data_sa; https://egis.environment.gov.za/protected_areas_database.

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1. What to use the mapbook for

It serves as the primary source of information on biodiversity for:

Proactive forward planning: Serves as an input into spatial planning tools, such as Integrated Development Plans (IDPs), Spatial Development Frameworks (SDFs), Environmental Management Frameworks (EMFs), Municipal Open Space Systems and land use schemes.

Reactive land use decision-making: Provides guidance for evaluating Environmental Impact Assessments, Basic Assessments, agricultural land use permits, water use authorisations and development control decisions through land use legislation (e.g. rezoning and subdivision approvals), such as the Spatial Planning and Land Use Management Act (16 of 2013).

Proactive conservation: Provides input into decisions on the expansion of protected areas through land acquisition by the state and biodiversity stewardship agreements with private or communal landowners, and for clearing of alien invasive plants.

2. How to use the mapbook

- 1] Go to the index map on page X, locate the area on the index map, and note which map page (Tile No.) it is on;
- 2] Go to the page/ Tile No. & locate the site by using the property boundaries (Farm Names) and other features;
- 3] Determine from the colour of the property what the site's category classification is (Critical Biodiversity Area, Ecological Support Area, Other Natural Area, No Natural Remaining) - refer to the key on the index map page;
- 4] Note on the CBA Map 1:50 000 rivers, streams or drainage lines, roads and railways.
- 5] For the vegetation type look on the adjacent page which includes modification i.e. cleared habitat in white. Note: Wetlands, dams and waterbodies are displayed in blue.
- 6] Refer to the biodiversity-compatible Land-Use Guidelines Matrix (on page 2 below);
- 7] Refer to the land management guidelines (Section 4 of the Mapbook, page 2).

Overall scale of the CBA map = 1:50 000

The CBA map cannot replace on-site assessments for land use applications. Therefore, the CBA map must be used in conjunction with a site visit to inform site level decisions.

Refer to page 2 below for 'Steps to follow when using the CBA Map'.

3. What are Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA)

The CBA Map divides the landscape into Protected Areas, (PA), Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA) (referred to as **biodiversity priority areas**), including Other Natural Areas and No Natural Remaining.

- **Protected Areas (PA)** are declared in terms of the National Environment Management: Protected Areas Act (57 of 2003).
- **Critical Biodiversity Areas (CBA)** are terrestrial (land) and aquatic (water) areas which must be safeguarded in their natural/ near-natural state because they are critical for conserving biodiversity and maintaining ecosystem functioning. These include natural areas required to (a) meet national biodiversity targets (thresholds); (b) ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services (e.g. water supply); and/or (c) important locations for biodiversity features or rare species.
- **Ecological Support Areas (ESA)** are supporting zones which must be safeguarded to prevent the degradation of CBA and PA.

4. Recommended biodiversity-compatible land use guidelines matrix

The central component of the CBA Map is the land use guidelines developed for the biodiversity priority areas (adapted from the MPTA, 2014; DEA&DP, 2004).

NOTE: There are some slight differences with the land uses recommended in the Mopani District Bioregional Plan (Part 4, Tables 3 - 7). These are indicated in Table 16 of the BSP handbook. The BSP thus supports and elaborates upon the Mopani District Bioregional Plan (2016).



No	Land Use Zone	Associated Land use Activities	PA	CBA1	CBA2	ESA1	ESA2	ONA	NNR		
1	Environmental Conservation (& similar zones in EMFs etc.)	Conservation management, low-intensity eco-tourism activities and sustainable consumptive activities. This includes both gazetted Protected Areas (NEMPA) and non-gazetted conservation areas.	Y	Y	Y	Y	Y	Y	Y		
2	Tourism and Accommodation	Low Impact Eco-Tourism (e.g. lodge or other ecotourism infrastructure on game reserve)	Y	Y	Y	Y	Y	Y	Y		
		Medium Impact Tourism / Recreational and Accommodation.	N	R	R	R	R	Y	Y		
		High Impact Tourism / Recreational and Accommodation (e.g. golf and polo estates).	N	N	N	N	R	Y	Y		
3	Rural Residential	Low density rural housing or eco-estates.	N	R	R	R	R	Y	Y		
		Moderate density rural housing or eco-estates.	N	N	R	R	R	Y	Y		
		Traditional Communal Areas and Rural Communal Settlement (New).	N	N	N	R	R	Y	Y		
4	Agriculture	Extensive Game Farming	Y	Y	Y	Y	Y	Y	Y		
		Extensive Livestock Production	N	Y	Y	Y	Y	Y	Y		
		Extensive Game Breeding (≥100 ha camps)	N	R	R	Y	Y	Y	Y		
		Low Impact Extensive Game Breeding (permeable fencing and camps >100 ha)	N	Y	Y	Y	Y	Y	Y		
		Intensive Game Breeding (<100 ha camps, high stocking densities, impermeable fencing)	N	N	N	R	R	Y	Y		
		Arable Land - Dryland and Irrigated Crop Cultivation	N	N	N	N	R	Y	Y		
		Plantation Forestry: Timber Production.	N	N	N	N	R	Y	Y		
5	Open-Space	Public or Private Open-Space (Modified), includes recreational areas, parks etc. i.e. loss of indigenous vegetation	N	N	N	N	Y	Y	Y		
		Public or Private Open-Space (Natural) - includes natural open space (indigenous vegetation retained or rehabilitated in ESA2)	Y	Y	Y	Y	Y	Y	Y		
6	Residential	Low, low-medium, medium-high, and high density urban residential development.	N	N	N	N	N	Y	Y		
7	Urban Influence	An amalgamation of land use zones, including Institutional, Urban Influence, General Mixed Use, Low Impact Mixed Use, Suburban Mixed Use and General Business.	N	N	N	N	N	Y	Y		
8	Low or High Impact and General Industry	Low Impact, General Industry and High Impact Industry (Urban & Business Development).	N	N	N	N	N	Y	Y		
9	Transport Services	Transportation service land uses e.g. airports, railway stations, petroports and truck stops, bus and taxi ranks and other transport depots.	N	N	N	R	R	Y	Y		
10	Roads and Railways	Existing and planned linear infrastructure such as hardened roads and railways, including activities and buildings associated with road construction and maintenance, e.g. toll booths, construction camps and road depot sites. (Linear Engineering Structures)	N	N	R	R	R	Y	Y		
11	Utilities	Linear engineering structures, such as pipelines, canals and power lines. (Linear Engineering Structures)	N	R	R	R	R	Y	Y		
		Small-scale Infrastructural installations, including wastewater treatment works and energy sub-stations	N	N	R	R	R	Y	Y		
		Large-scale Infrastructure installations, including bulk water transfer schemes, impoundments (Water Projects & Transfers), and energy-generation facilities.	N	N	N	N	R	Y	Y		
		Renewable Energy (Photovoltaic farms and solar arrays)	N	N	N	R	R	Y	Y		
		Renewable Energy (wind farms)	N	N	R	R	R	Y	Y		
12	Quarrying and Mining	Prospecting and Underground Mining	N	N	N	R	R	Y	Y		
		Quarrying and opencast mining (includes surface mining, dumping & dredging).	N	N	N	N	N	Y	Y		
		Hydraulic Fracturing	N	N	R	R	R	Y	Y		
SPECIAL MANAGEMENT OVERLAY ZONE											
13	CBA Map Overlay Zone / Bioregional Planning Overlay Zone / Environmental Management Overlay Zone	These are areas that are designated as priority areas for protection, namely CBAs and ESAs. Therefore the land use activities for CBA and ESA above will apply.	Land use activities for CBA and ESA above will apply								

Refer to Table 15 of the BSP handbook for a detailed definition of the land uses.

5. Steps to follow when using the CBA map & considering a land use change

STEP by STEP Guide to using the CBA Map / Biodiversity Sector Plan data

Step 1: Assess the Biodiversity Sector Plan / CBA Map Information

Consult the following GIS data to determine the CBA Map category, biodiversity features and land cover on the property:

- Consult the CBA Map GIS shapefile to determine the category of the property (CBA, ESA, ONA and/or No Natural Remaining).
- Consult the associated GIS shapefiles to determine the presence of specific biodiversity features on the property e.g. wetland, river, vegetation type. *It is important to note that the wetland data is not accurate, and that the updated CBA Map for the Municipality verified (as far as possible) natural versus artificial wetlands. However, the individual wetlands are not displayed on the CBA Map as wetlands; rather, natural wetlands are either CBA or ESA 1 (as per the criteria table below).*
- Consult the 'Land Cover' GIS shapefile to determine the land cover category of the property (natural, degraded, irreversibly modified etc.). *The updated CBA Map for the Municipality corrected (as far as possible) additional areas that are modified, which represent No Natural Remaining or ESA 2 on the CBA Map.*

The user friendly APP can also be used to interrogate the CBA Map in relation to the property in question.

Step 2: Assess Other Available Information

Consult other available information to assist with interpreting the biodiversity of the property and surrounding area. This is especially important since the CBA Map was not done at an accurate scale. E.G:

- Up-to-date orthophotos, aerial or satellite imagery and Google Earth imagery to assess the presence of natural vegetation on site and/or the level of modification or degradation.
- The Land use Decision Support (LUDS) Tool on the SANBI BGIS website at <http://bgis.sanbi.org> to determine property specific details, and aerial imagery via Google Earth, if necessary.
- The SANBI website for additional biodiversity information resources at <http://www.sanbi.org/information>.
- The national and provincial Protected Area Expansion Strategies to identify focus areas for expansion of the protected area network (downloadable from the SANBI BGIS website).
- The Provincial Spatial Development Framework (SDF) for land use policy recommendations.
- Other strategic guidelines e.g. Grazing and Burning Guidelines (SANBI, 2014); Guidelines for Development within Kruger to Canyons Biosphere Region (unpublished report), Mining and Biodiversity Guideline (SANBI, 2013); Buffer zone guidelines for rivers, wetlands and estuaries (Macfarlane and Bredin, 2016 & 2017) etc.

Step 3: Site Verification

A biodiversity specialist or ecologist should conduct a site visit to verify that the CBA Map is accurate. This is especially important since the CBA Map was *not* done at an accurate scale. The role of the specialist is to confirm or modify the CBA Map classification of the site based on observed conditions.

Refer to Section 5.1.3 of the Biodiversity Sector Plan (BSP) handbook for the minimum requirements to be determined by the specialist.

Step 4: Consult the Guidelines for Land Use Planning and Decision-Making (Section 4 of the BSP)

Once the CBA Map category of the property has been verified (Step 3), consult the land management objective (Table 13), recommended biodiversity-compatible land uses (Table 14) and land management guidelines (**Error! Reference source not found.**) in Section 4 of the *Biodiversity Sector Plan (BSP)* Handbook. A comparison of the BSP land use guidelines with the Mopani District Bioregional Plan is provided in Table 16.

Step 5: Follow the terms of reference for environmental assessments (recommended by the Botanical Society of South Africa - Conservation Unit)

The terms of reference should then be followed as part of the environmental assessment process (basic assessment or full EIA). Refer to Section 5.1.5 of the *Biodiversity Sector Plan (BSP)* handbook or download the terms of reference @ <http://biodiversityadvisor.sanbi.org/planning-and-assessment/environmental-assessments/contextualisation/what-is-screening/tor-for-screening/>

All mapped information should be provided in shapefile (GIS) format, with the proposed development area (go area) and the area that will not be developed (no go area) presented in hectares (extent of go and no go area per cadastral unit). This data should be integrated into a GIS land use management database to monitor changes in the CBA Map and the loss of biodiversity in the municipal area

Refer to Section 5.1.6 of the BSP handbook for 'Frequently asked questions when using the CBA Map' to understand the map better

6. Criteria used to define the CBA map categories

CBA MAP CATEGORY NAME AND CRITERION	DESCRIPTION OF BIODIVERSITY FEATURES USED TO DEFINE THE CBA MAP CATEGORY	CBA MAP LEVEL CODES	
Protected Areas			
Protected Areas	Protected Areas recognised in the Protected Areas Act including South African National Parks, LEDET nature reserves and private nature reserves gazetted under NEM:PAA. Note that the Protected Areas (PA) are required to meet targets and are an intrinsic part of the CBA network. Intact areas in PA are required to meet targets, therefore it is important that in any instance where a Protected Area has been incorrectly mapped, that these sites are assumed to be CBA2. Only in cases where the PA status is incorrect and there is clear evidence of complete biodiversity loss at a site, would it be acceptable to treat the site as No Natural Remaining. These issues would need to be dealt with when the systematic conservation plan (or CBA Map) is updated.	PA	
Critical Biodiversity Area 1			
Irreplaceable Sites	Planning units with high irreplaceability values based on the MARXAN analysis, i.e. areas or sites that are mandatory if biodiversity targets are to be achieved. These include irreplaceable areas for: <ul style="list-style-type: none"> Threatened species (including all sites for Critically Endangered and Endangered plants, and all threatened butterflies). Threatened ecosystems (especially Critically Endangered and Endangered, where these are found). All forest areas. Ecological processes (including Critical Biodiversity Corridor Linkages in the provincial biodiversity corridor network where existing conversion of natural landscapes to other uses has severely restricted options for maintaining connectivity in the natural landscape). Key ecological infrastructure (e.g. most sites in Strategic Water Source Areas). Key areas for climate change adaptation (e.g. areas for Ecosystem-based Adaptation and key intact areas of plant centres of Endemism). 	CBA1	
FEPA Rivers	All FEPA rivers (FEPA 1) buffered by 100m as identified in NFEPA		
FEPA wetlands	Natural FEPA-priority wetlands as identified in NFEPA.		
FEPA wetland Clusters	Natural FEPA wetland clusters as identified in NFEPA		
Critical Biodiversity Areas 2			
Best design sites	Planning units selected in the revised district MARXAN analysis, i.e. where options exist to achieve targets these are areas or sites that are selected to achieve biodiversity targets based on spatial context or avoidance of conflict with other land uses. These include areas that represent the best design to meet remaining targets for: <ul style="list-style-type: none"> Threatened and other important species (especially the best design areas to meet targets for Vulnerable plant and other species, and best design portions of Important Bird Areas). Ecosystems (terrestrial and aquatic). Ecological processes (including the remainder of the provincial biodiversity corridor network). Ecological infrastructure. Additional areas for climate change adaptation (e.g. areas for Ecosystem-based Adaptation). <i>(includes extensive grazing areas)</i>	CBA2	
Ecological Support Areas			
Other wetlands	All other natural wetlands not included as CBA.	ESA1 if natural	ESA2 if not natural
Important Bird Areas	Remaining portions of Important Bird Areas not included as CBA.		
Important habitats for climate change adaption	Hills and ridges identified, and other high value ecological support features or high value climate change adaptation features which were not identified as CBA.		

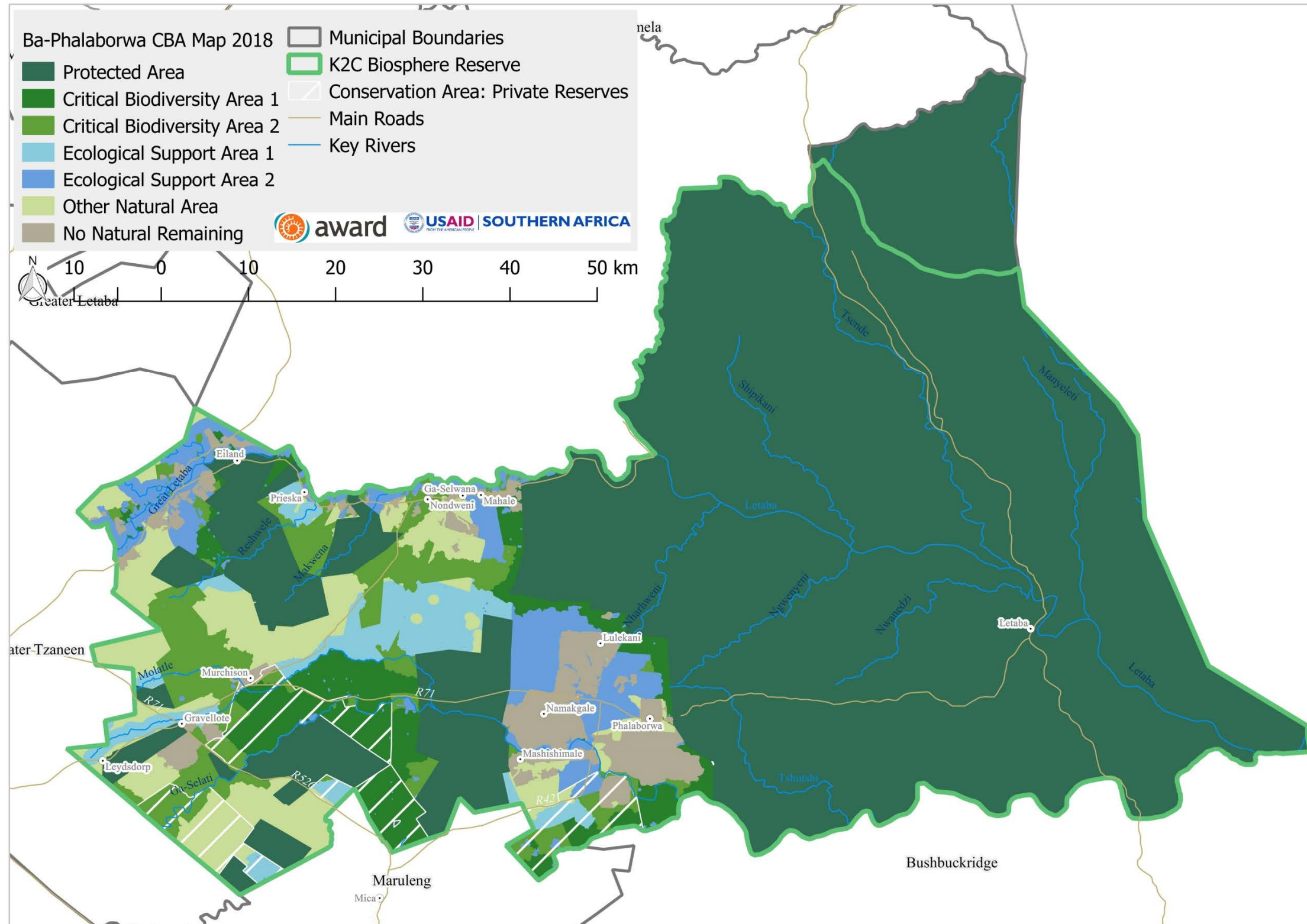
CBA MAP CATEGORY NAME AND CRITERION	DESCRIPTION OF BIODIVERSITY FEATURES USED TO DEFINE THE CBA MAP CATEGORY	CBA MAP LEVEL CODES	
Biodiversity Corridors (remaining areas)	Any remaining areas of the provincial-level biodiversity corridor network which could not be identified as CBA but where some remaining function needs to be retained (often highly impacted sections).		
FEPA river buffers (100m)	Buffer areas around any river identified as a FEPA (any category) where these have not been identified as a CBA.		
Buffers on large rivers (1000m)	Buffer areas around all larger rivers where the site is not a CBA.		
FEPA catchments	Areas of FEPA catchments (Category 1 & 2) not included as CBA.		
Strategic Water Source Areas	Remaining areas not included as CBA.		
Other Natural Areas	All remaining natural areas not included in the above CBA or ESA categories.	ONA	
No Natural Remaining	These are areas that have been irreversibly modified and do not contribute significantly to maintaining biodiversity pattern or ecological processes and include urban and rural settlements; cultivated lands; and mining areas.	NNR	
CONSERVATION AREA CATEGORIES			
CATEGORY	DESCRIPTION OF CONSERVATION AREA CATEGORY	CODES	
Conservation Areas (Non-gazetted private reserves)	Conservation Areas (e.g. non-gazetted private reserves) are not a specific category on the CBA Map but rather were used to inform CBA identification. The guideline for the underlying CBA category should be applied.	CA (Overlay)	
Conservation Areas (Biosphere Reserve)	The entire municipality is in the Kruger 2 Canyons Biosphere Reserve. These areas are not treated as a specific category on the CBA Map but rather were used to inform CBA identification. The guideline for the underlying CBA category should be applied.	CA (Outline)	

Key:

- CA: Conservation Area
- CBA: Critical Biodiversity Area
- ESA: Ecological Support Area
- FEPA: Freshwater Ecosystem Priority Areas
- NFEPA: National Freshwater Ecosystem Priority Areas assessment
- Other Natural Area: Other Natural Area
- NNR: No Natural Remaining
- PA: Protected Area

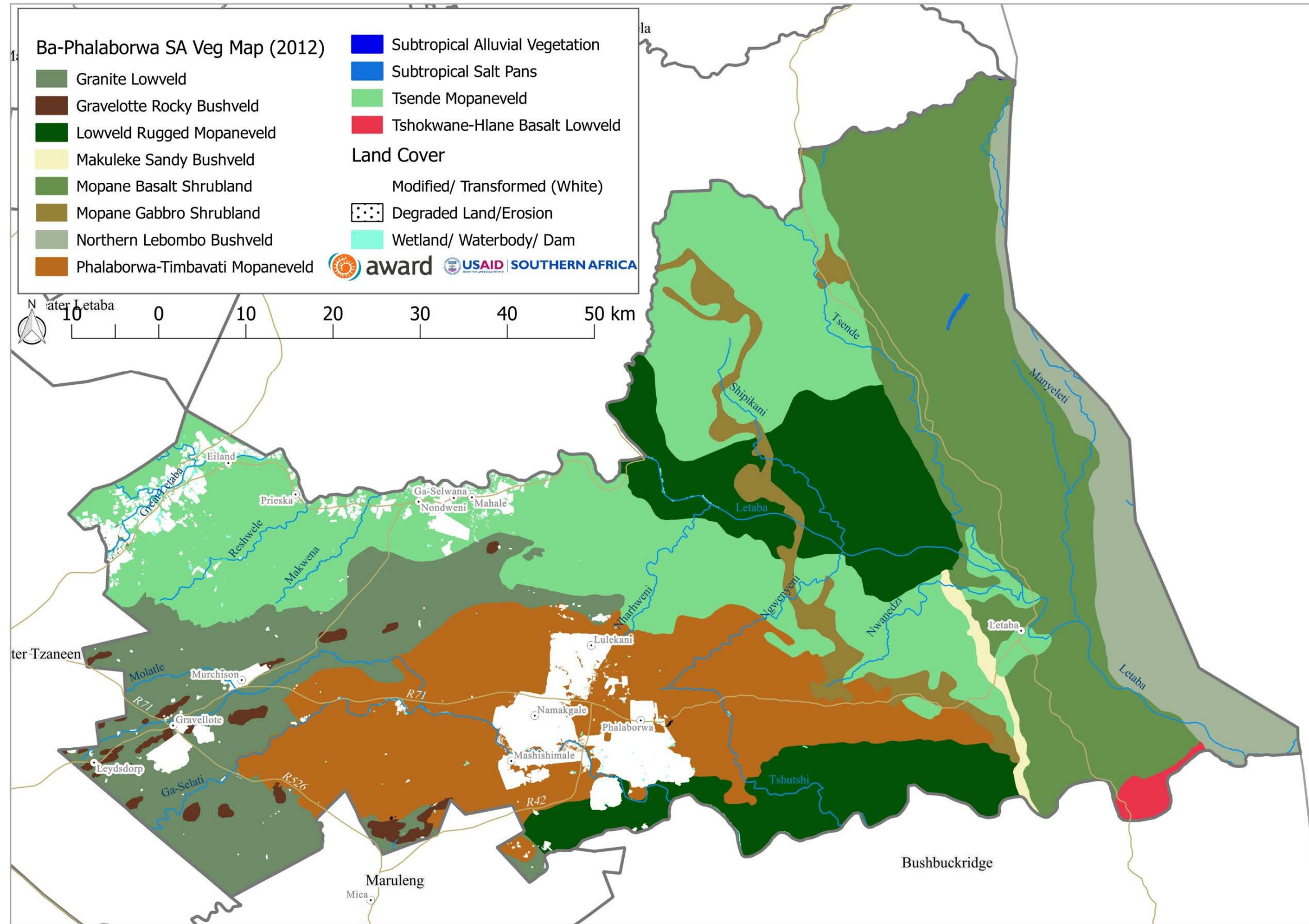
7. The Critical Biodiversity Areas (CBA) map for Ba-Phalaborwa (2018)

The CBA Map for the Municipality further updated the Mopani District Bioregional Plan (2016) in terms of (i) land cover, with associated CBA Map classification; and (ii) Protected Areas data. Land cover, in particular around urban and rural settlement areas, as well as mining and agricultural areas, were therefore further refined and corrected (in 2018) based on available land cover and heads-up digitizing to more accurately reflect existing land cover. For example, cleared areas that were previously indicated as CBA or ESA 1 were re-classified as ESA 2 or No Natural Remaining, thus representing actual site conditions. The Protected Areas, as reflected in the Mopani District Bioregional Plan, were updated to reflect the current Protected Areas in the Municipality, as per the South African Protected Areas Database (SAPAD) (DEA, 2013/14).



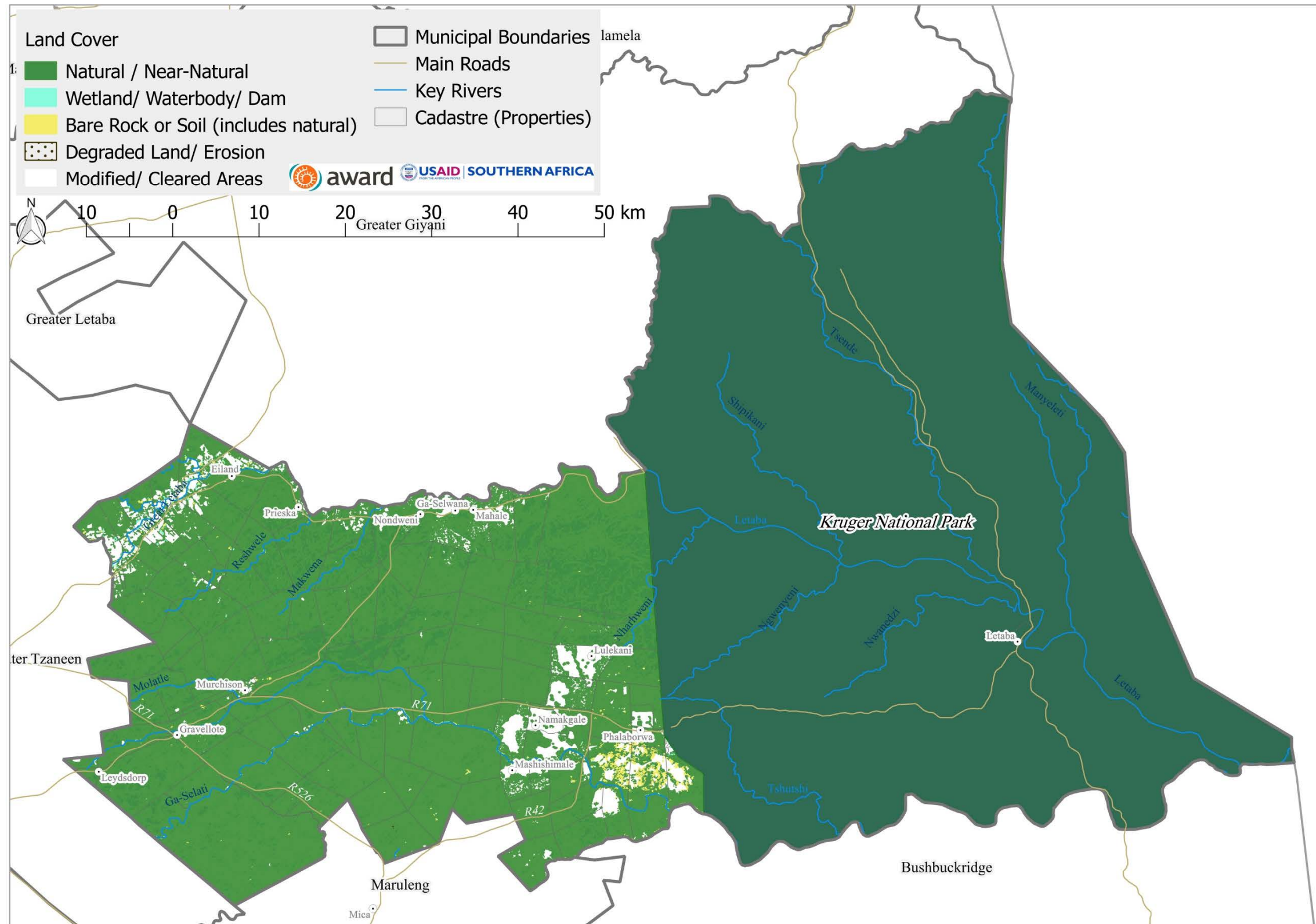
8. The Vegetation map (with modification)

The vegetation types are derived from the 'Vegetation of South Africa, Lesotho and Swaziland' (Mucina and Rutherford, 2006, amended 2012). Modification refers to vegetation that has been cleared (white areas on the map).



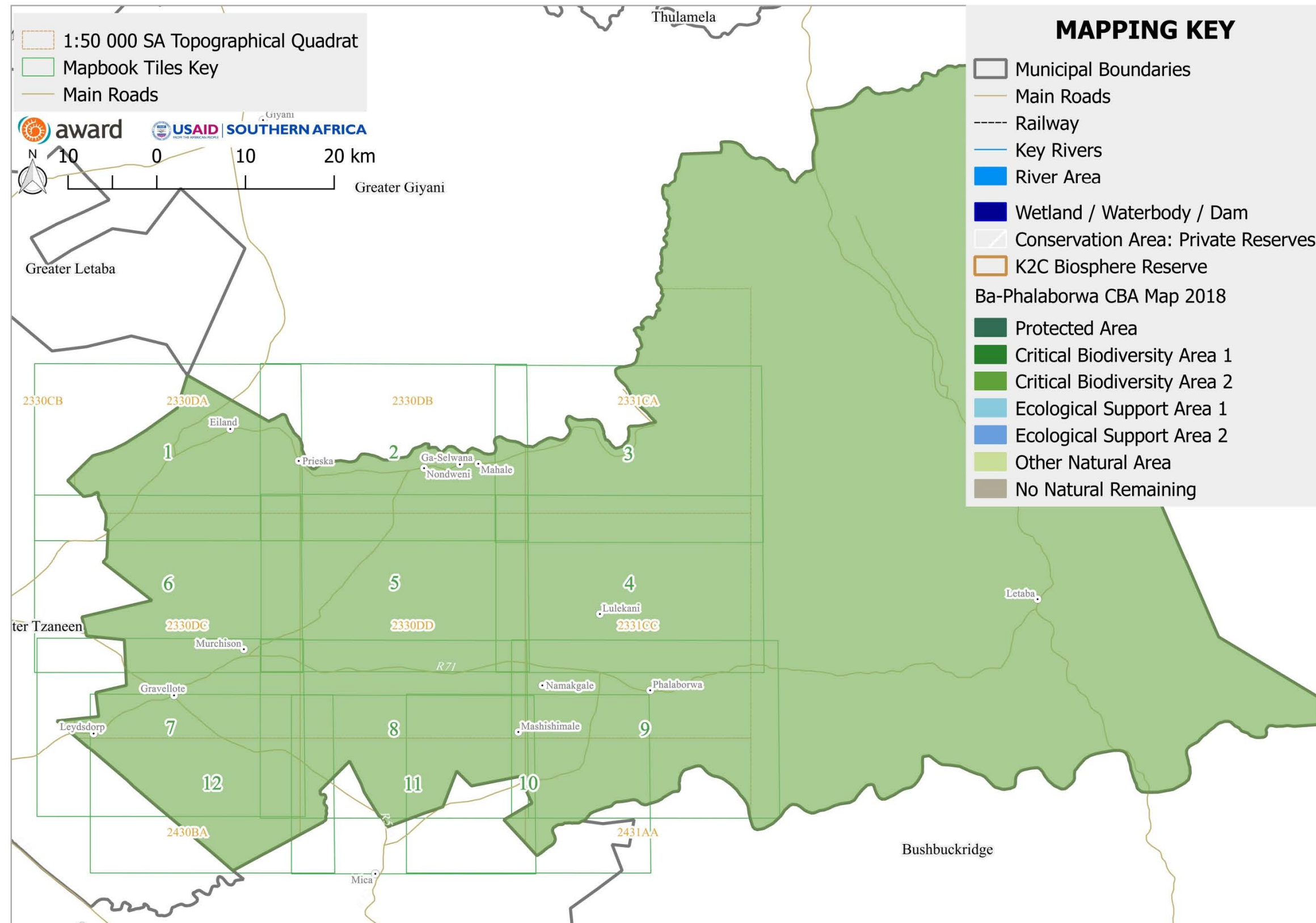
9. The Land cover map

The national land cover map (DEA, 2013 - 2014) was used to map land cover. The scale of the national land cover was done at a 30m resolution (this means two objects 30 meters long or wide, sitting side by side, can be separated (resolved) on an image), while some areas were poorly classified. Consequently, spatial inaccuracies in the land cover and classification errors will be evident. This emphasises the need to verify the CBA Map information through a site assessment. *Note: The CBA Map for the Municipality improved on the accuracy of the land cover in the CBA Map (as far as possible), and thus differences in the land cover map versus the CBA Map will occur (as it relates to land cover).*



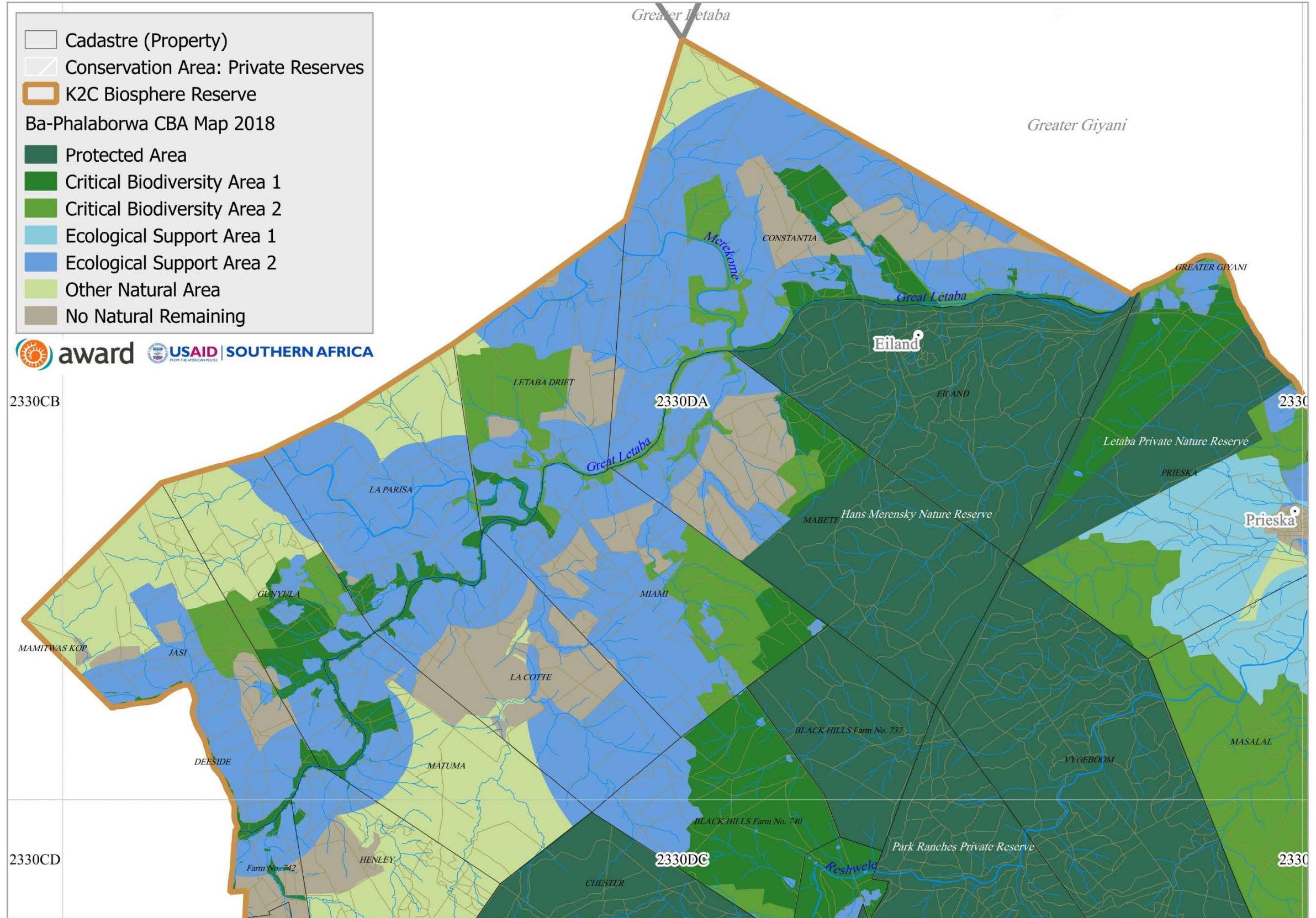
10. Index map: Tiled guide to different sections of the CBA map in the Municipality

Refer to the 'Mapping Key' below for the features on the respective maps to follow



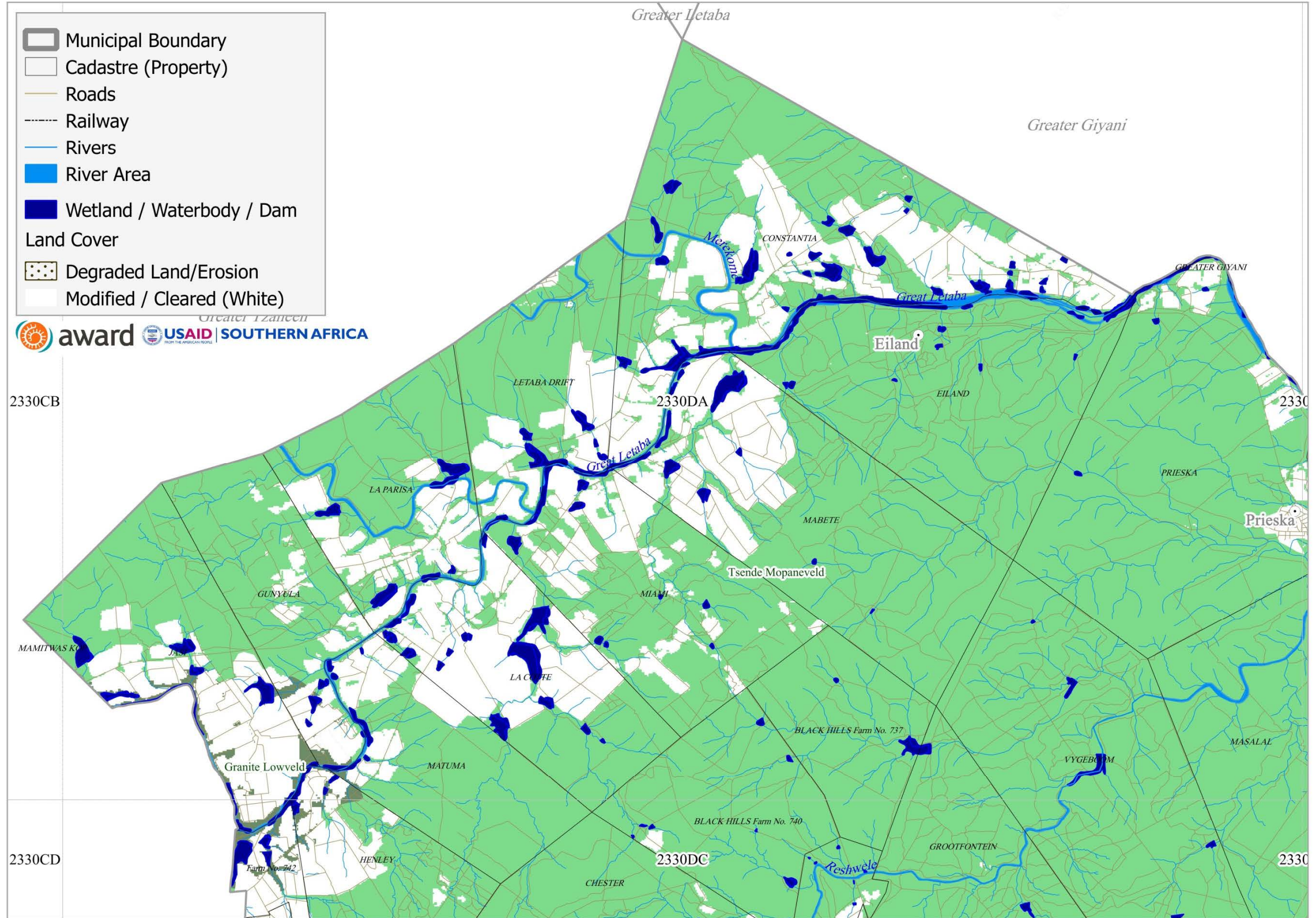


Tile 1 - CBA map



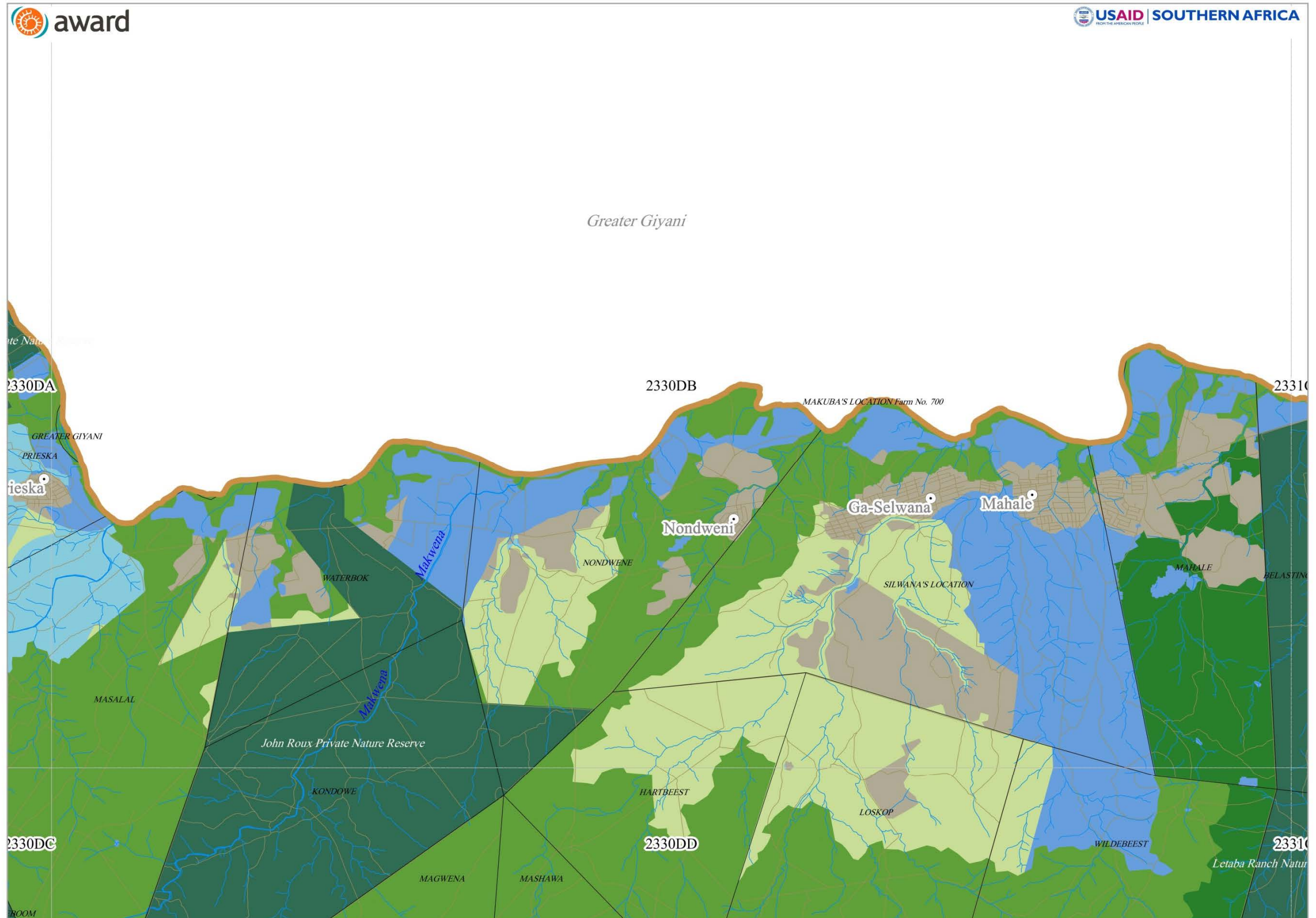


Tile 1: Vegetation map



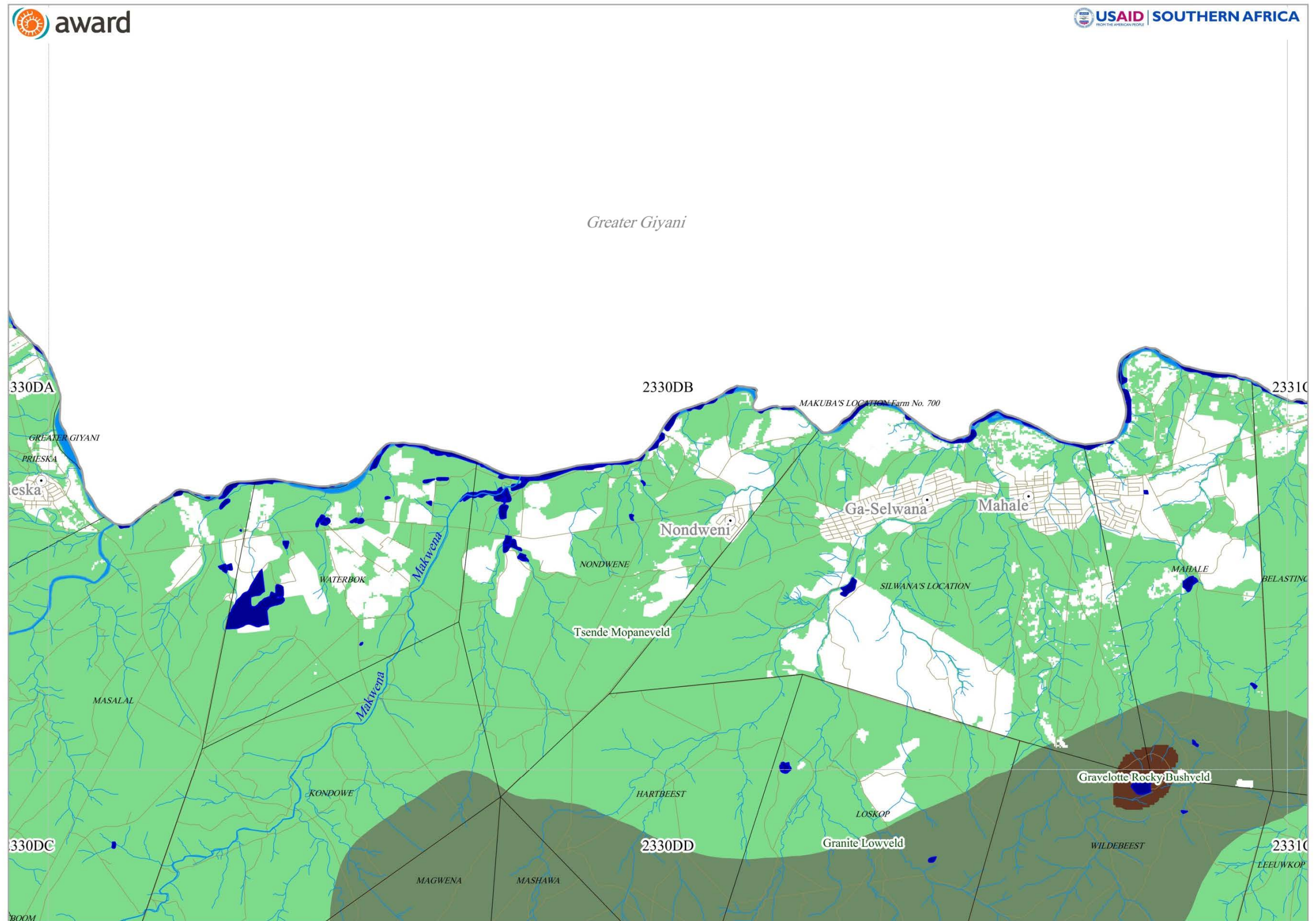


Tile 2: CBA map



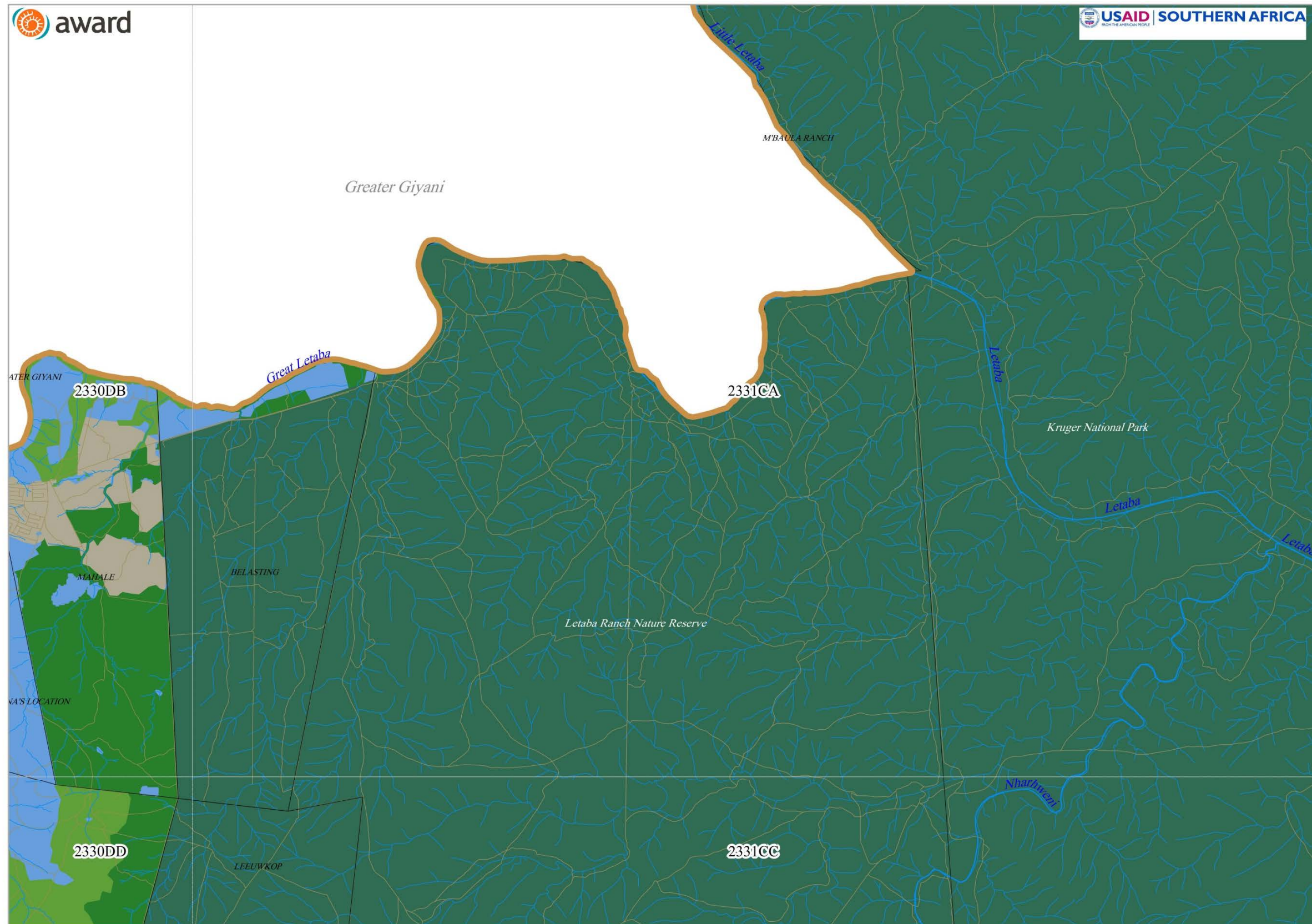


Tile 2: Vegetation map



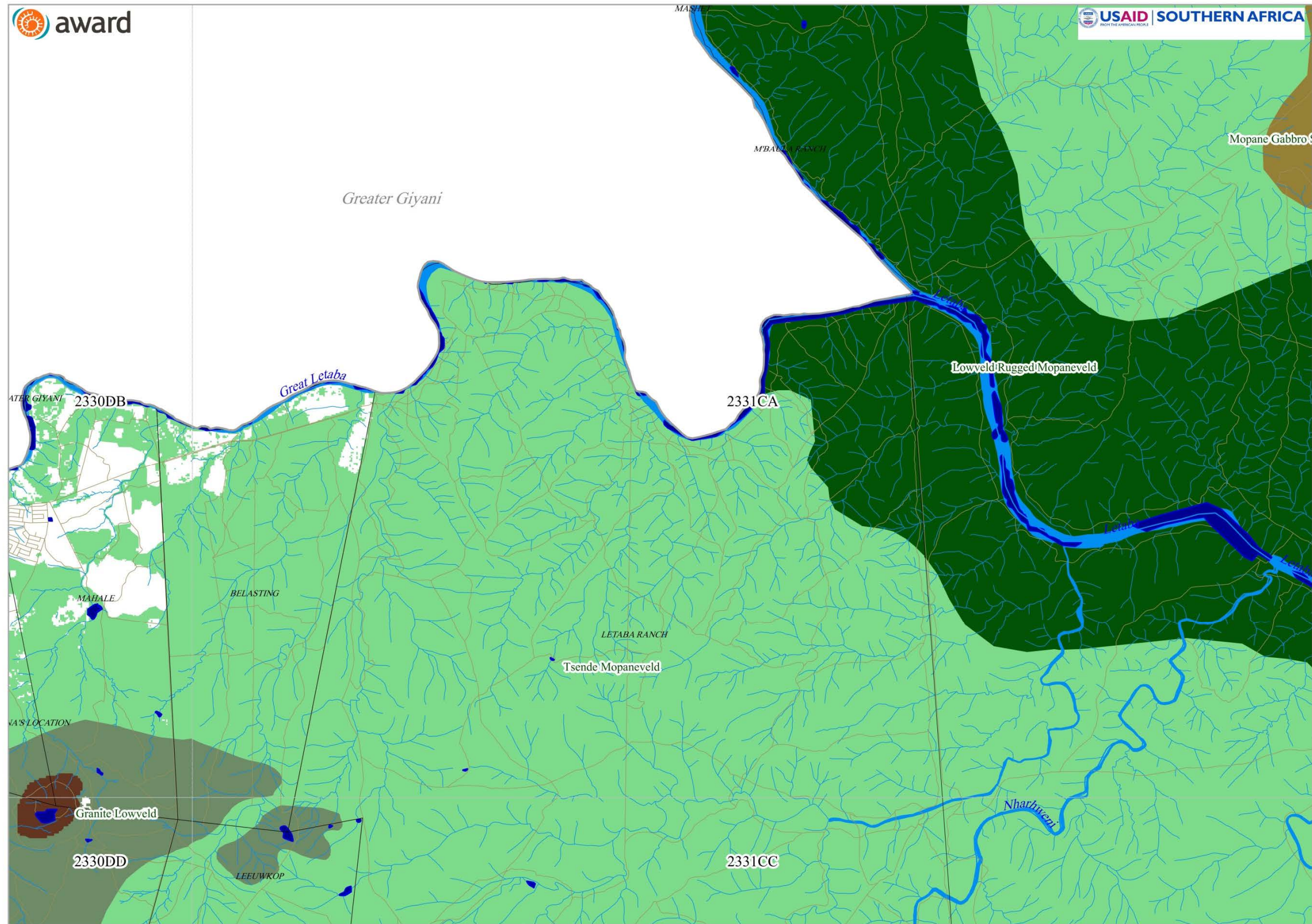


Tile 3: CBA Map



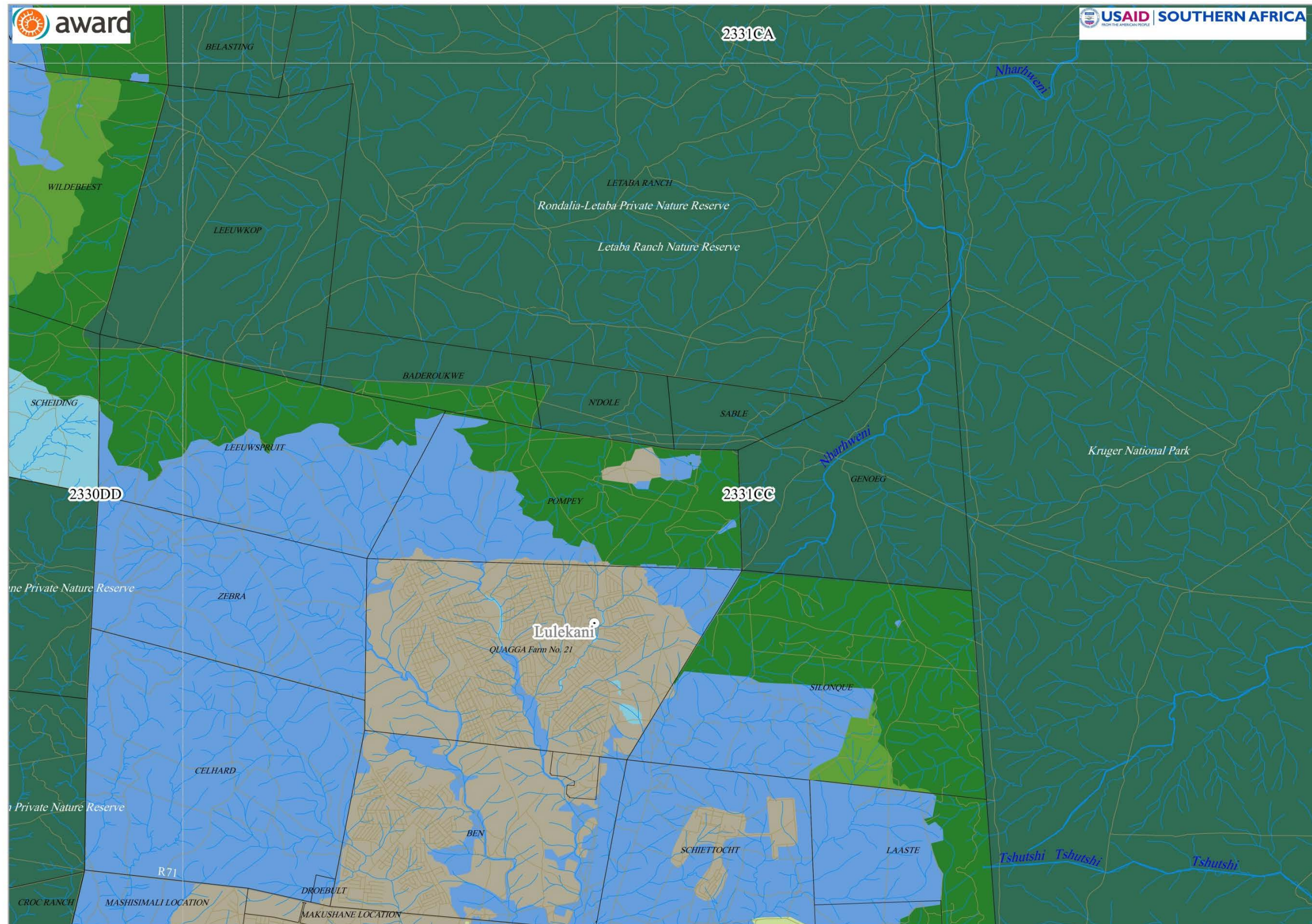


Tile 3: Vegetation map



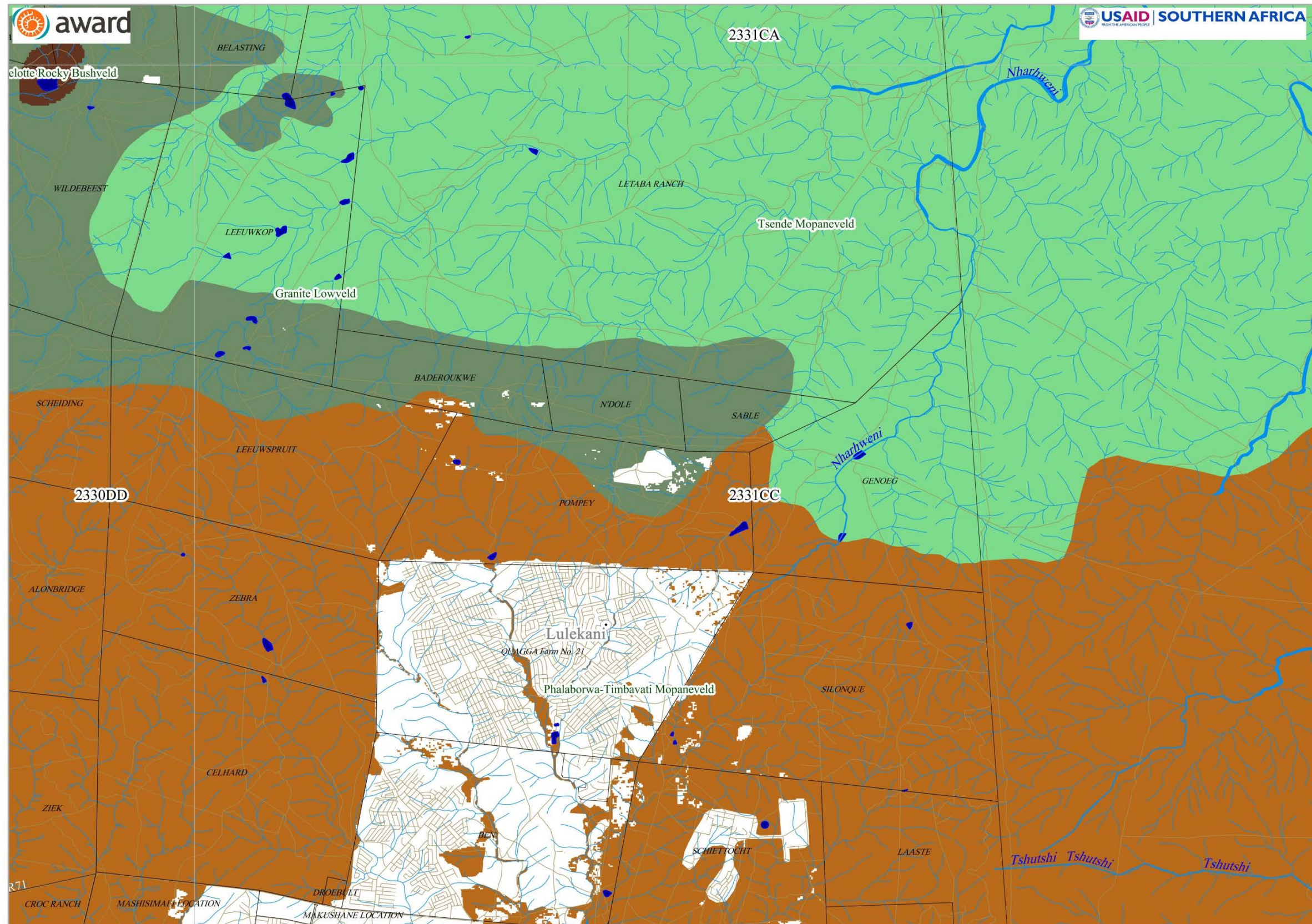


Tile 4: CBA map



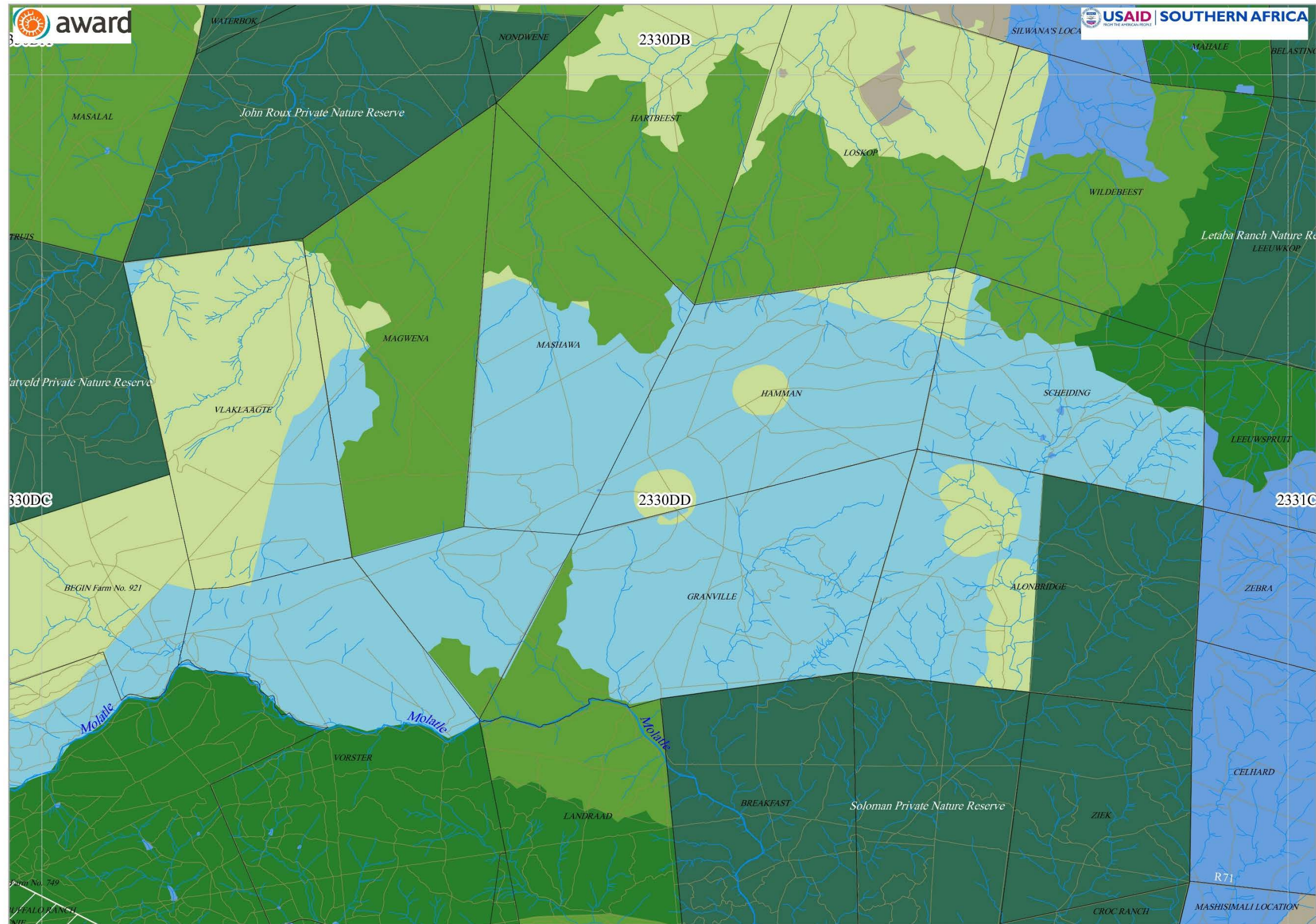


Tile 4: Vegetation map



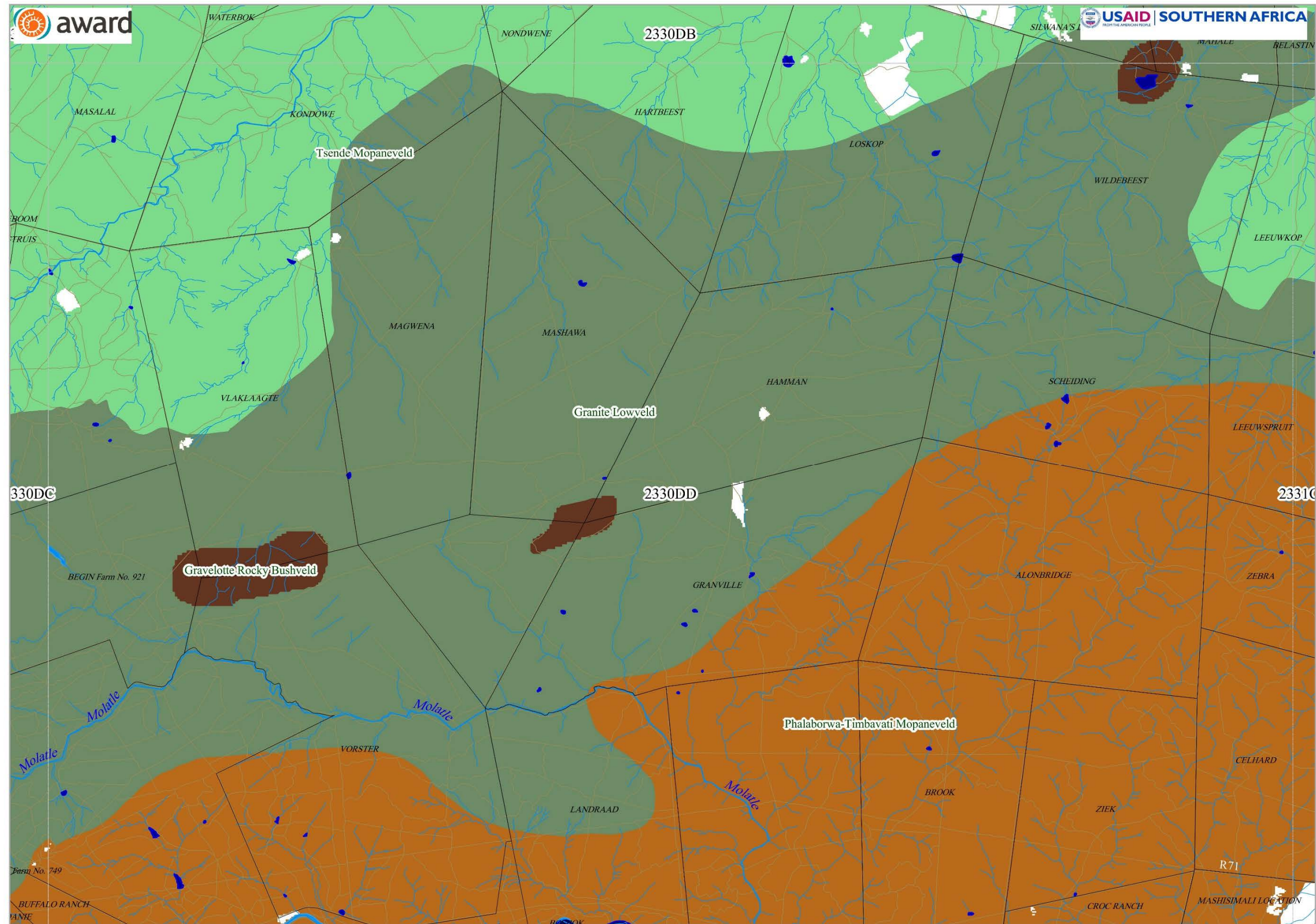


Tile 5: CBA map



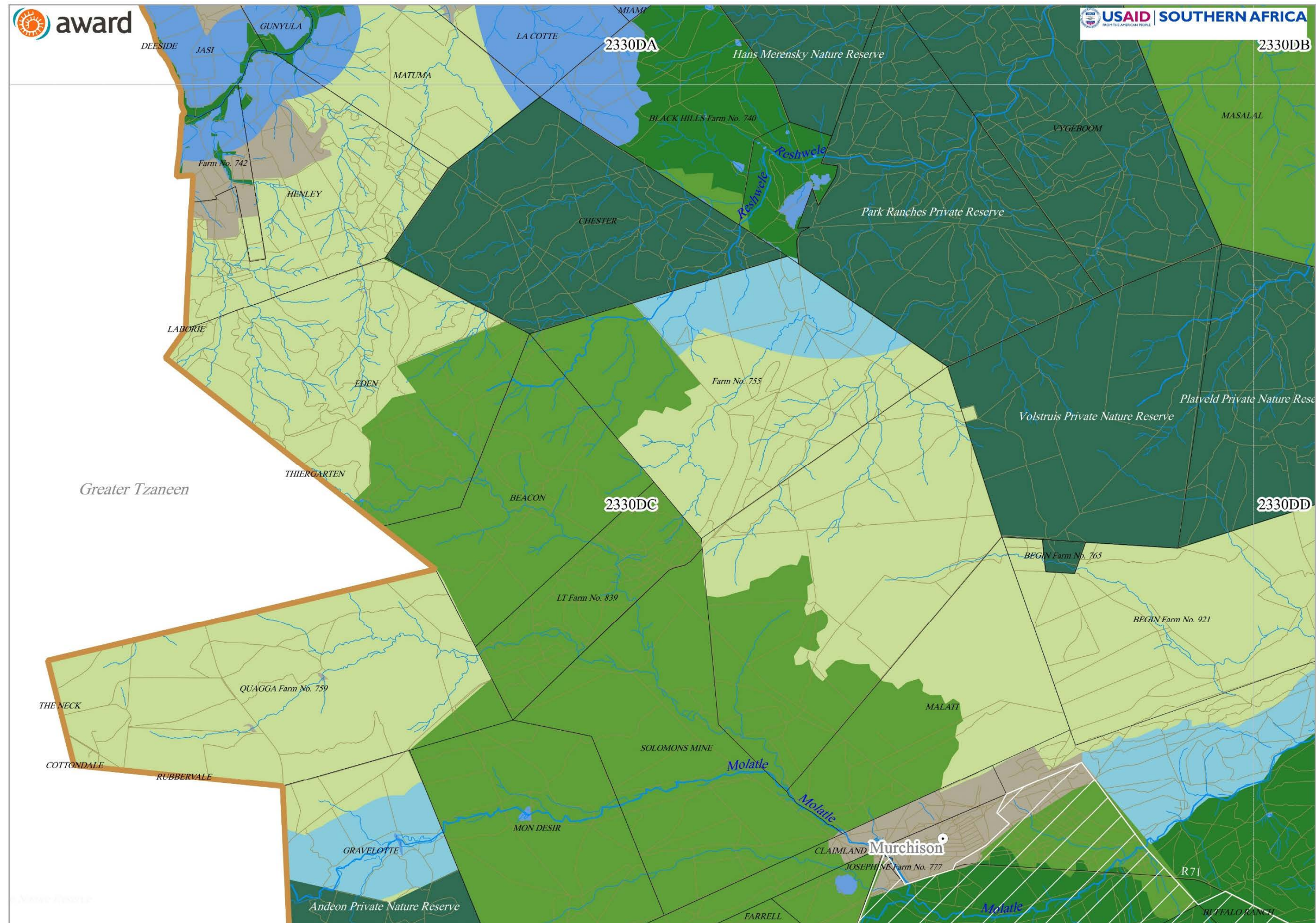


Tile 5: Vegetation map



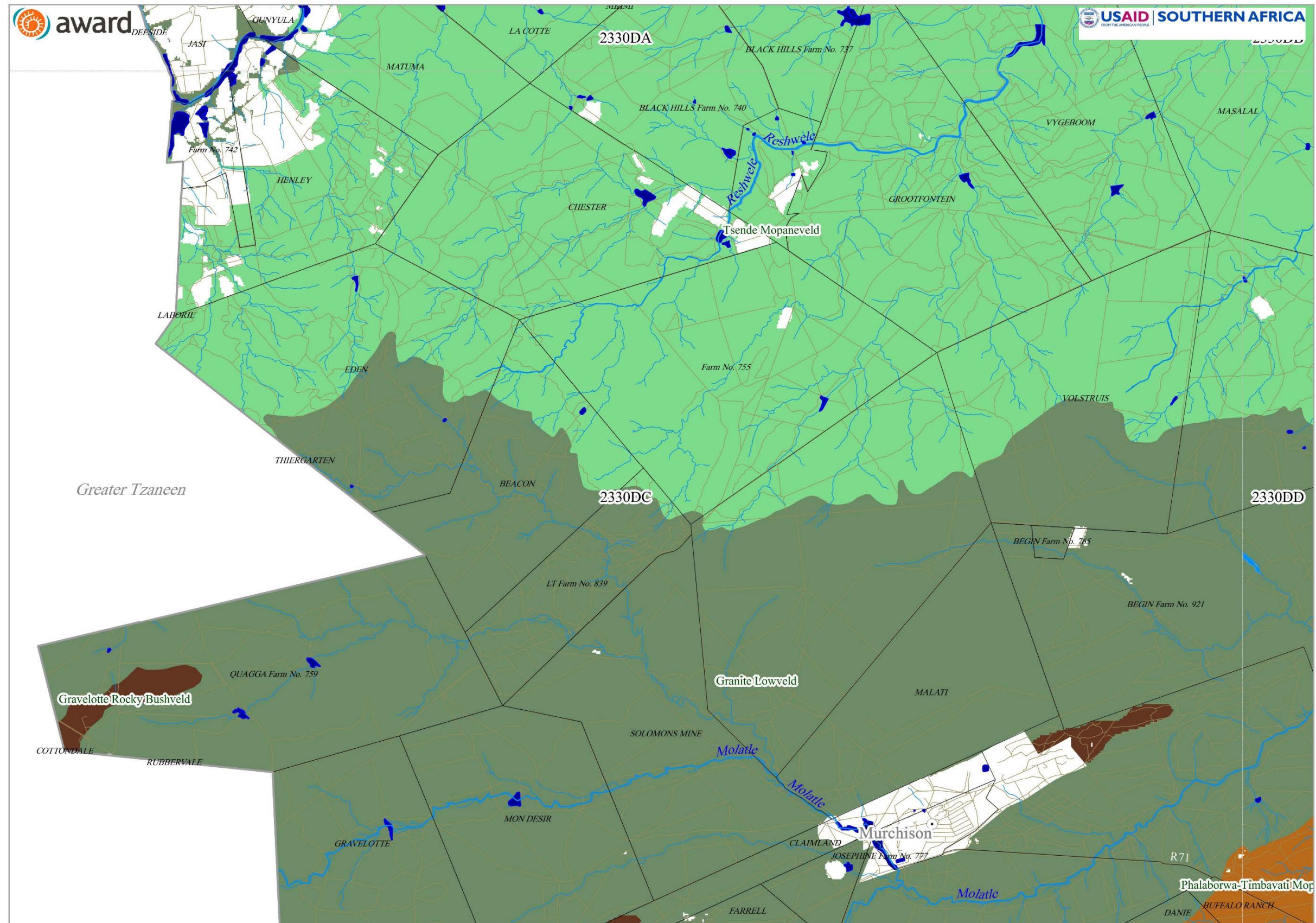


Tile 6: CBA map



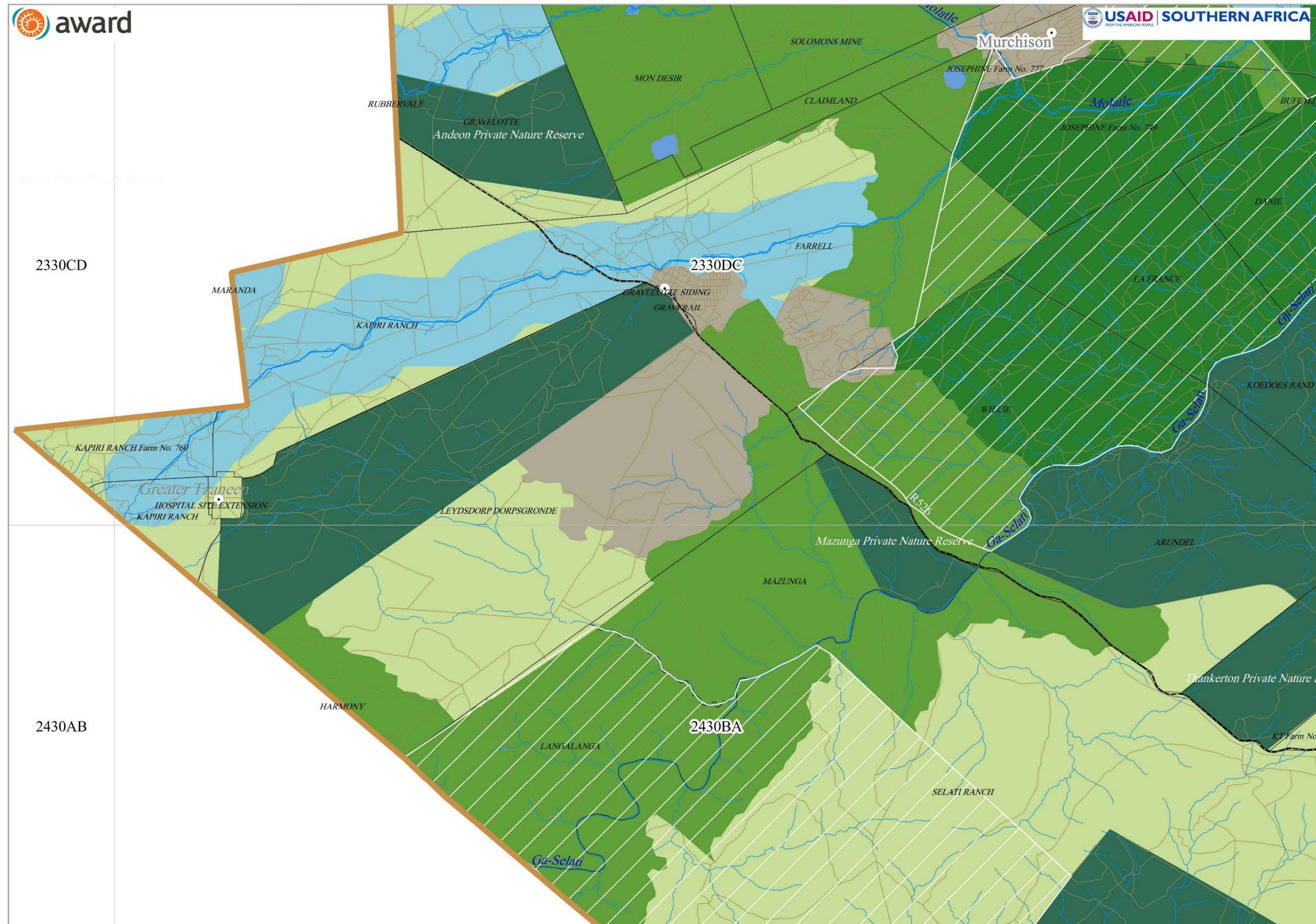


Tile 6: Vegetation map



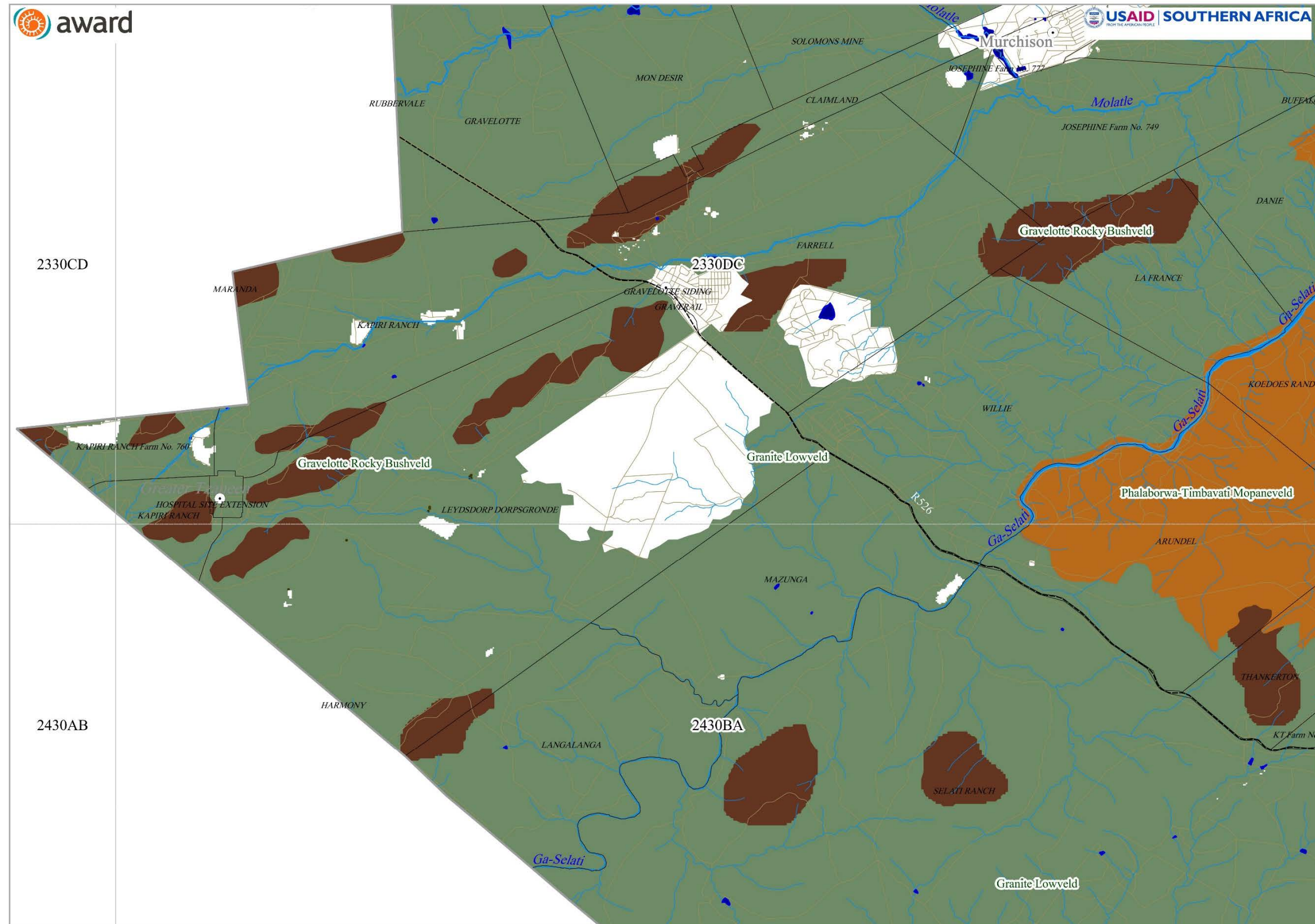


Tile 7: CBA map



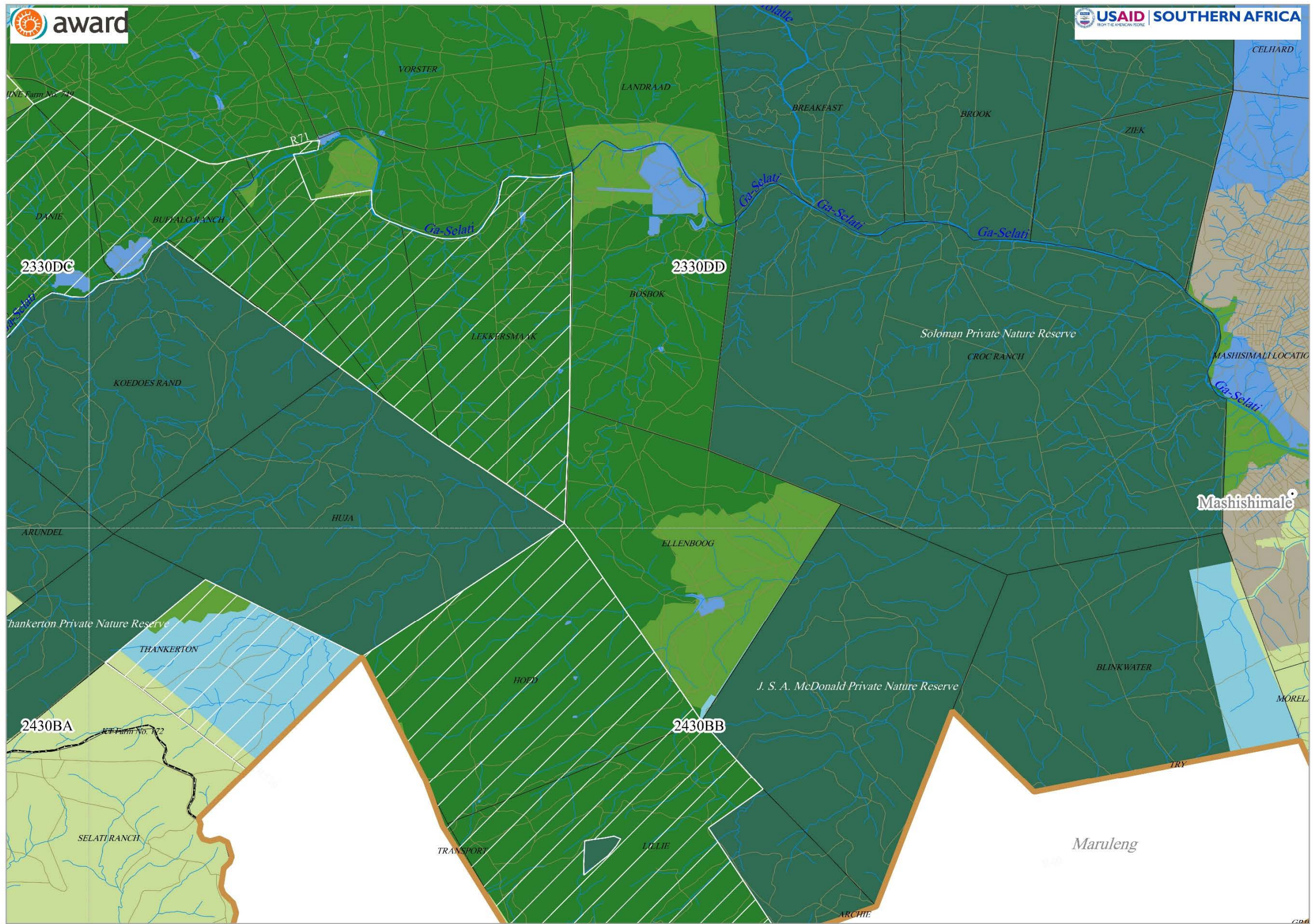


Tile 7: Vegetation map



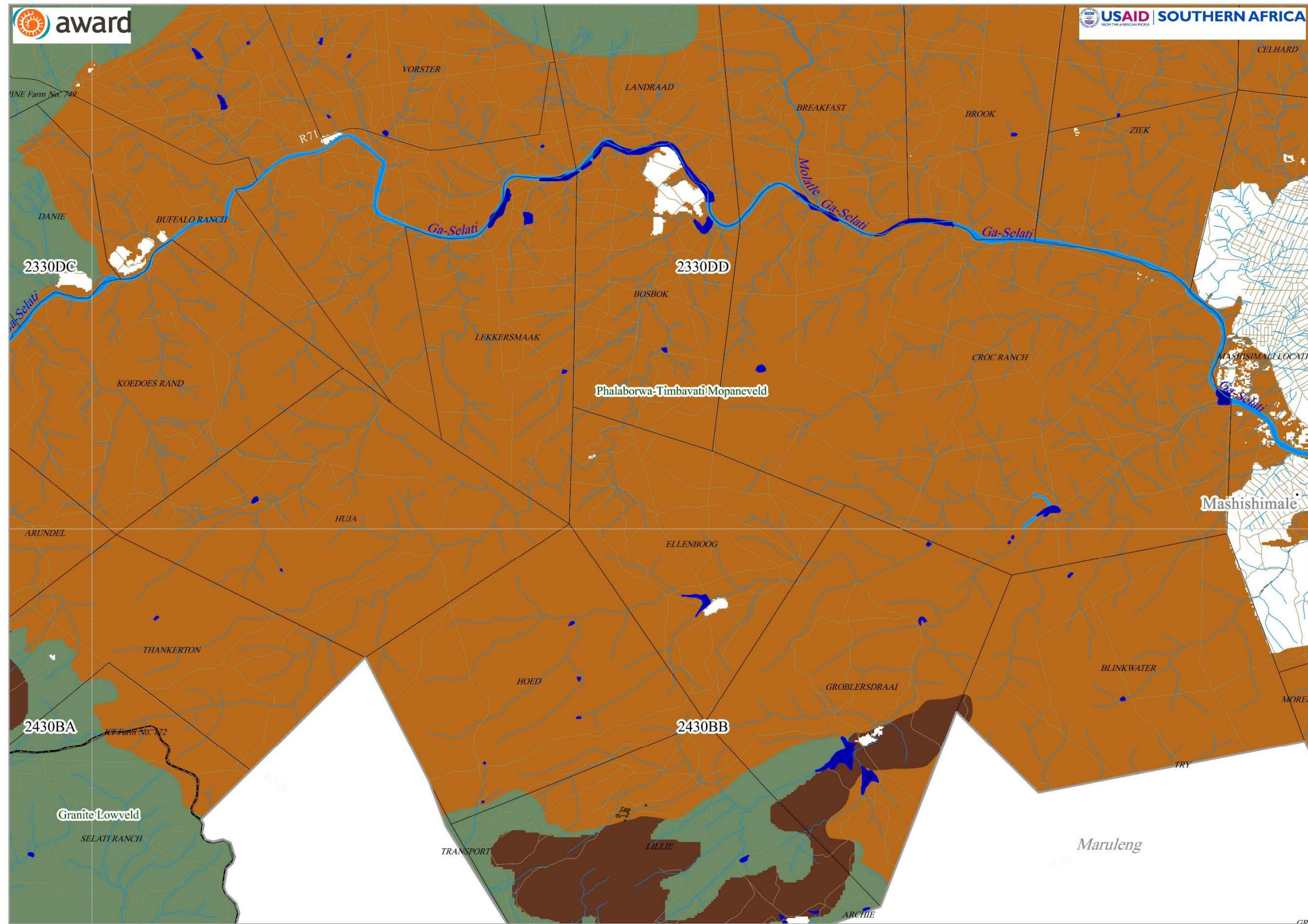


Tile 8: CBA map



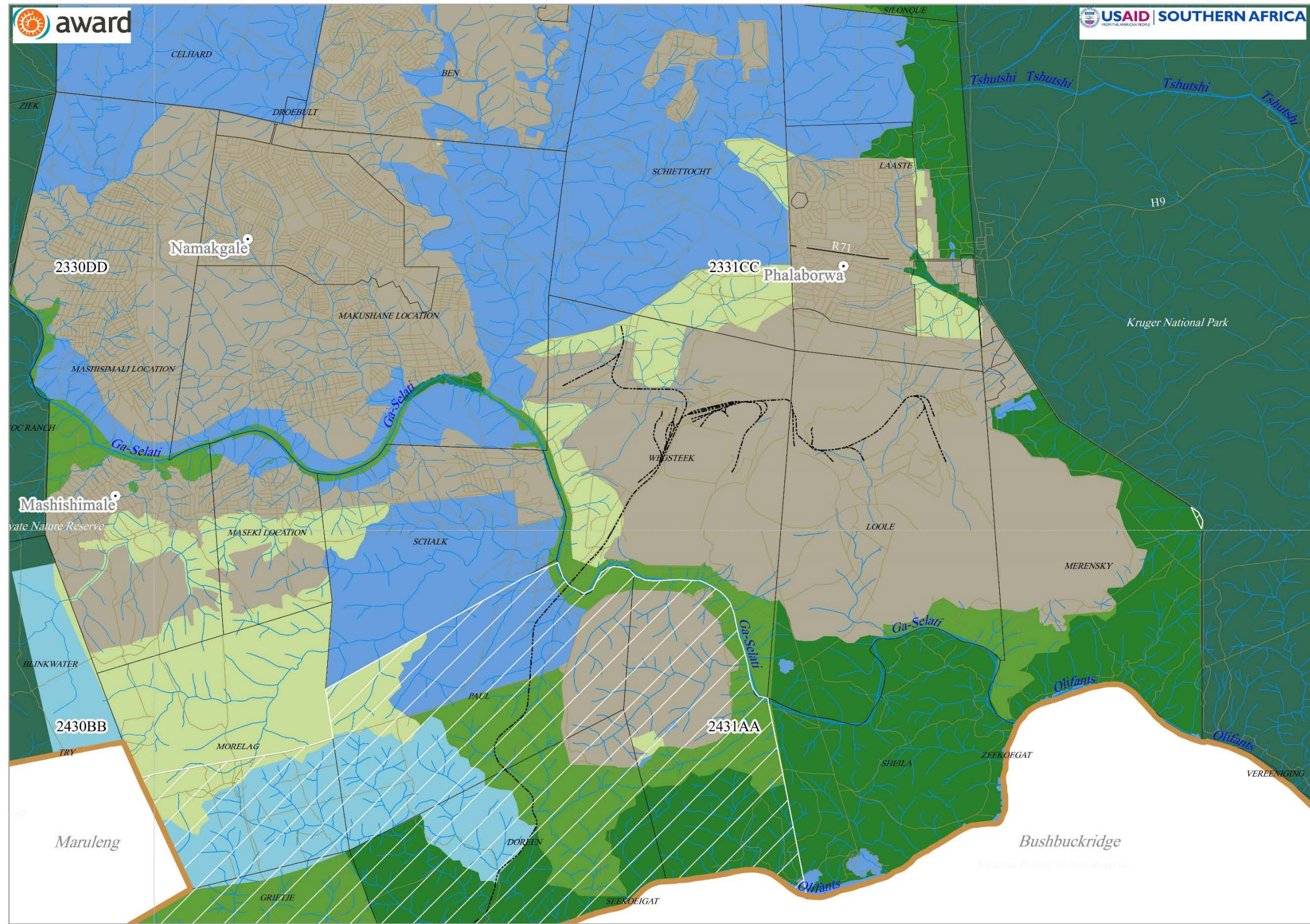


Tile 8: Vegetation map



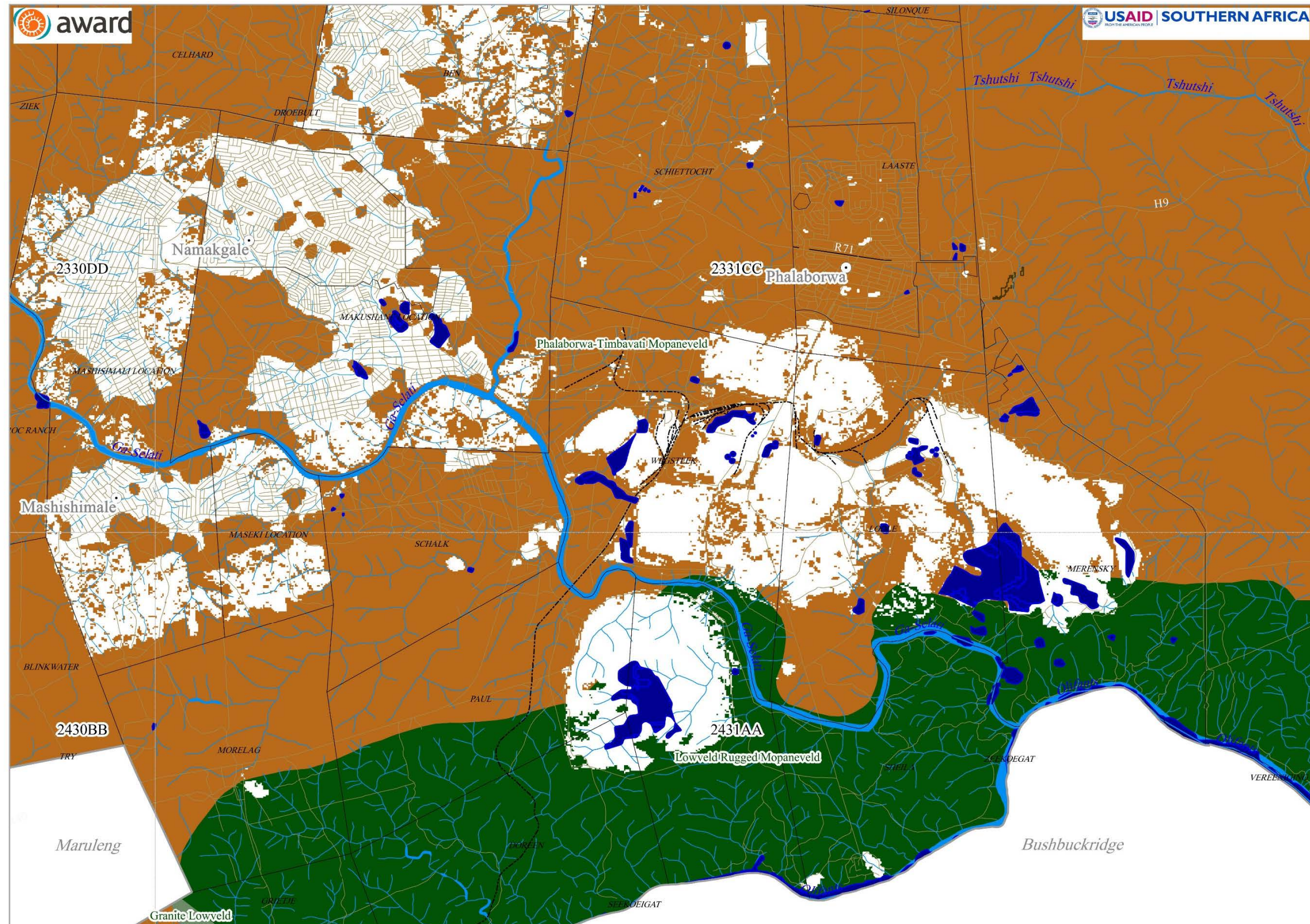


Tile 9: CBA map



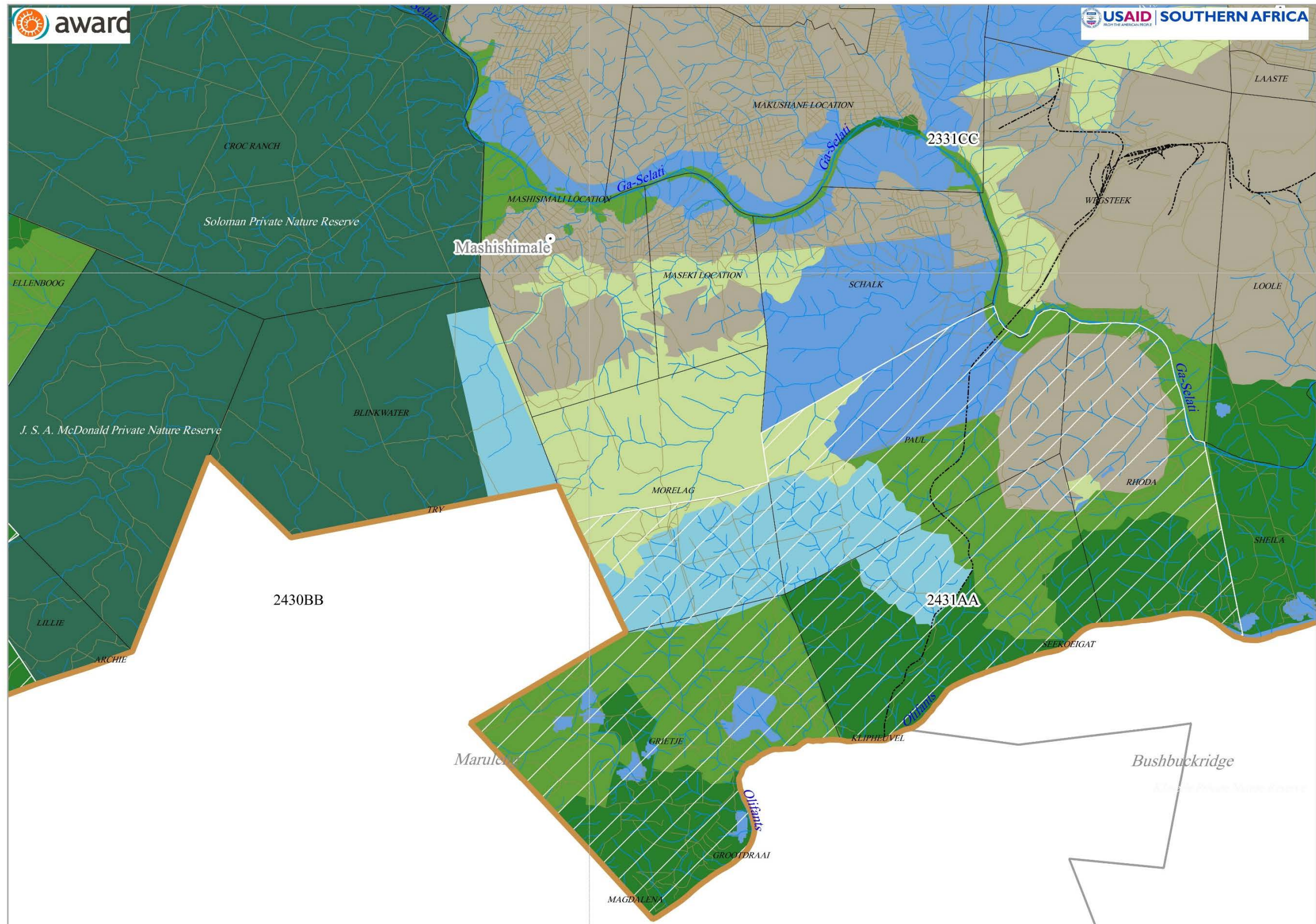


Tile 9: Vegetation map



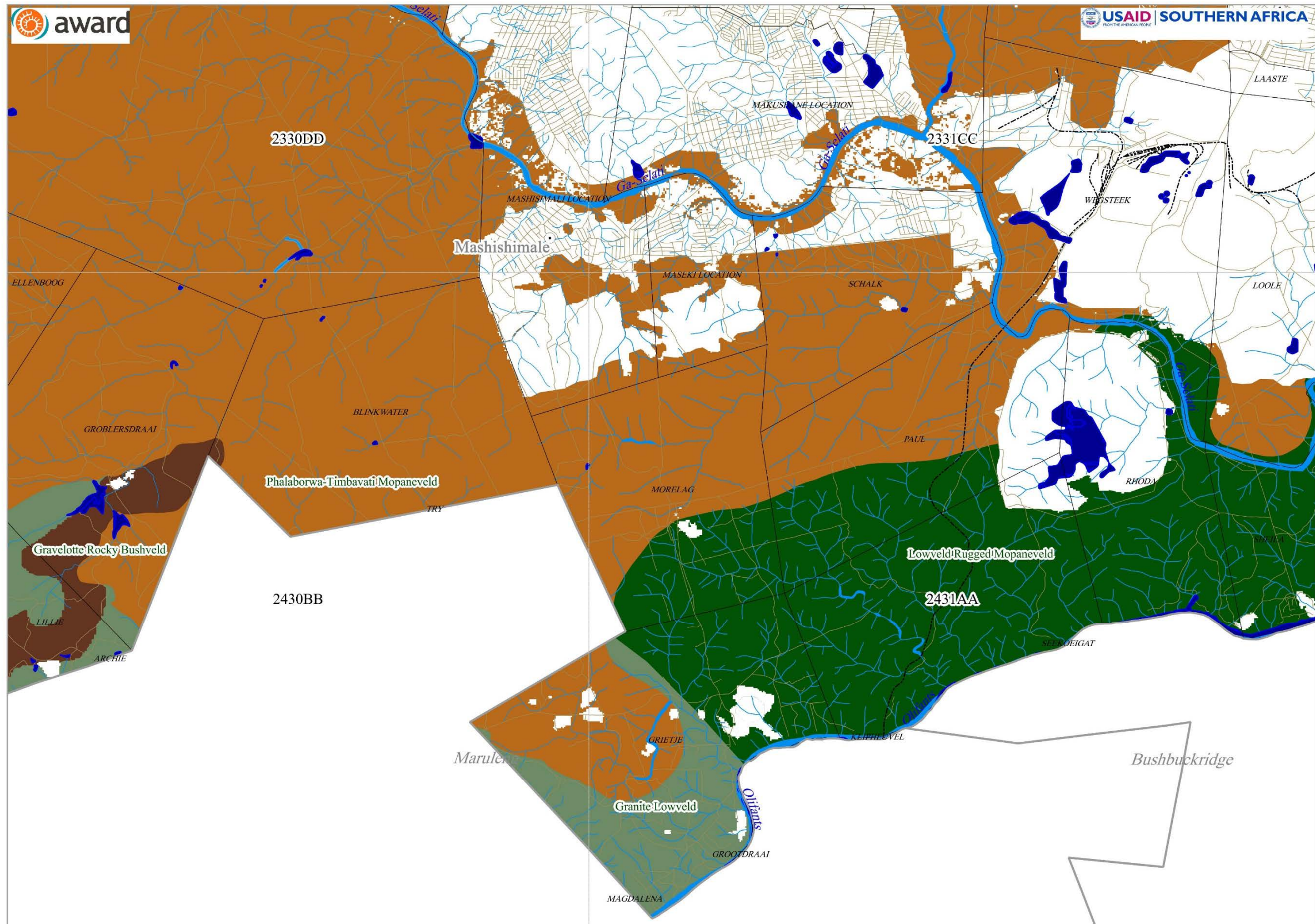


Tile 10: CBA map



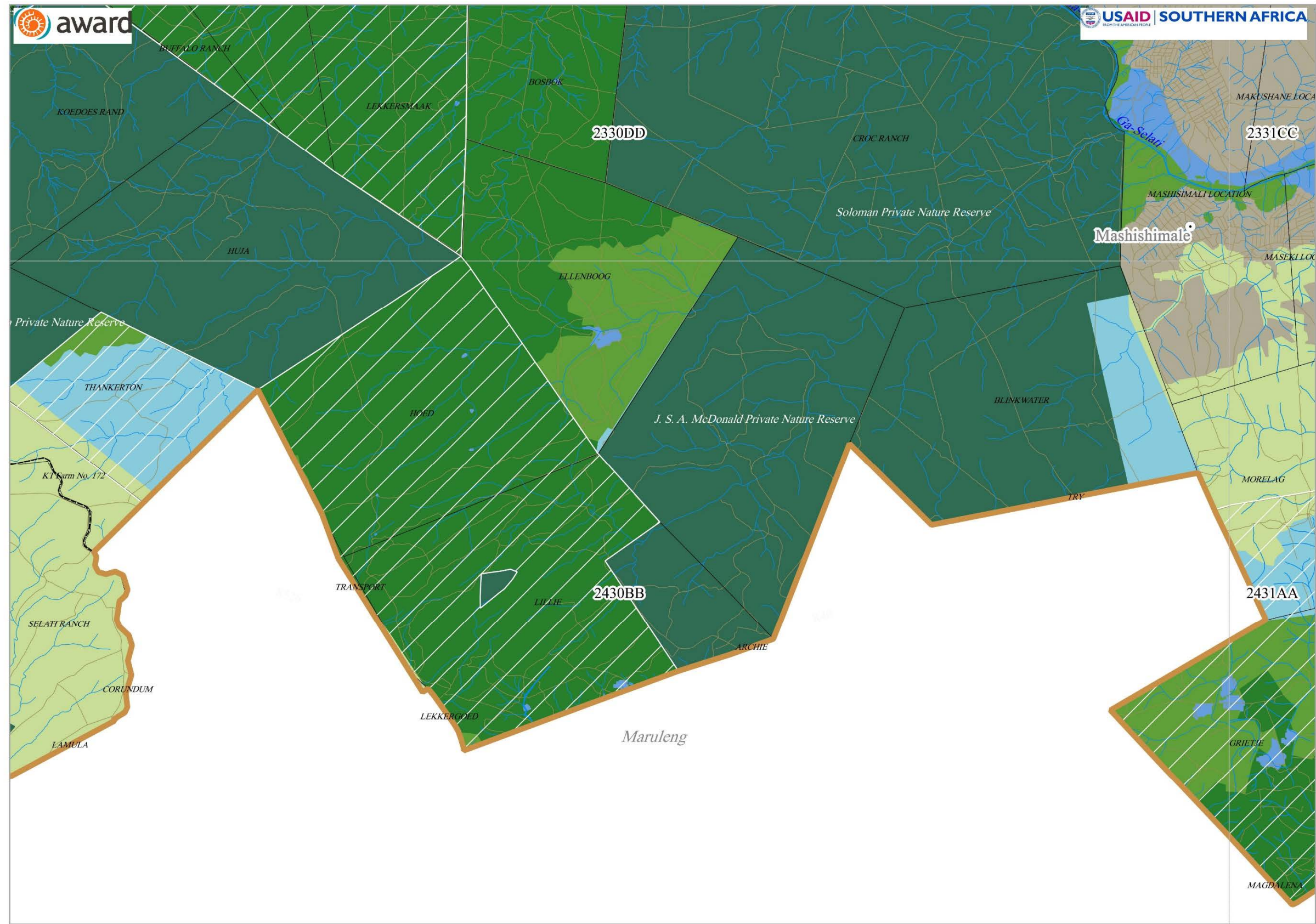


Tile 10: Vegetation map



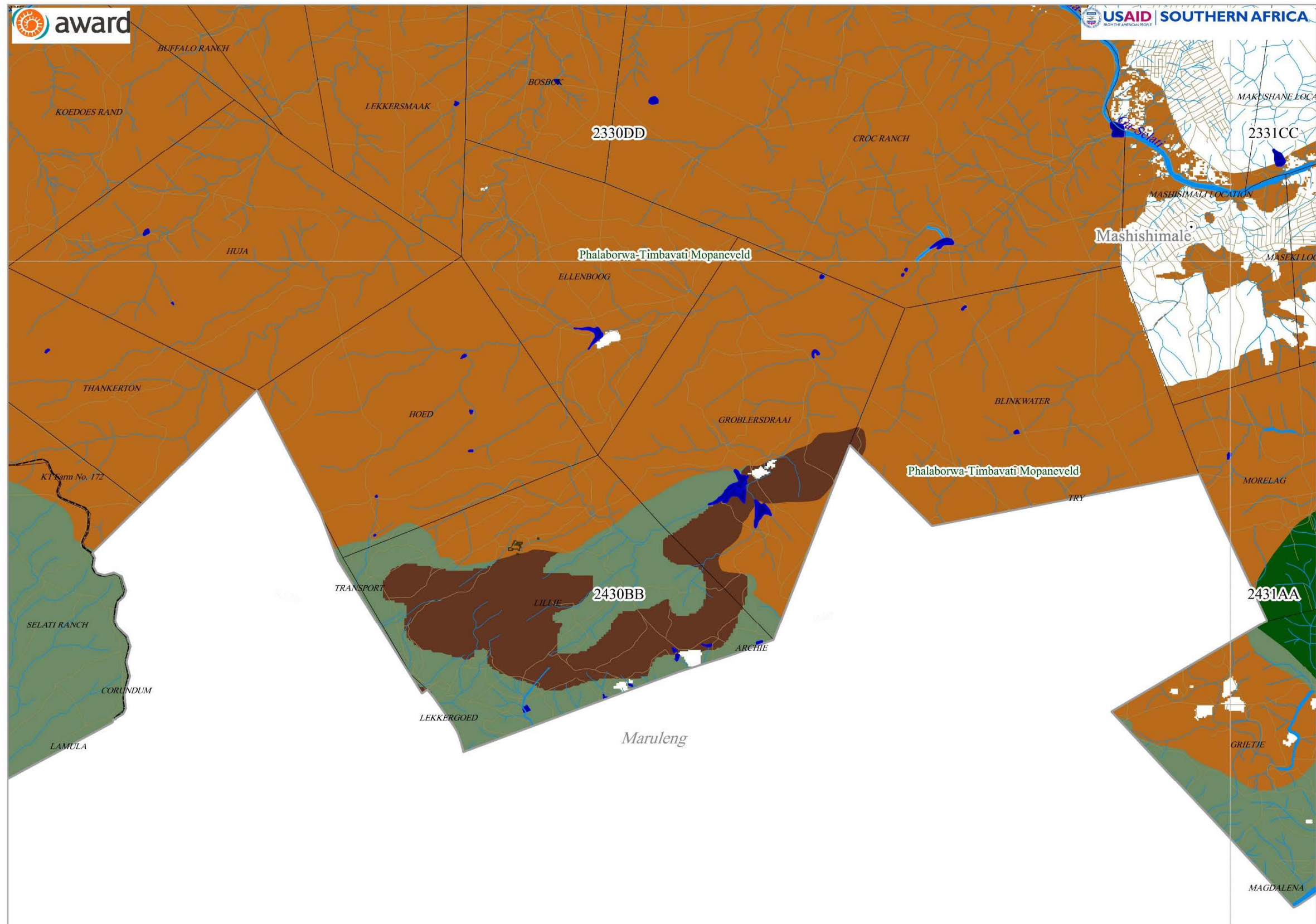


Tile 11: CBA map



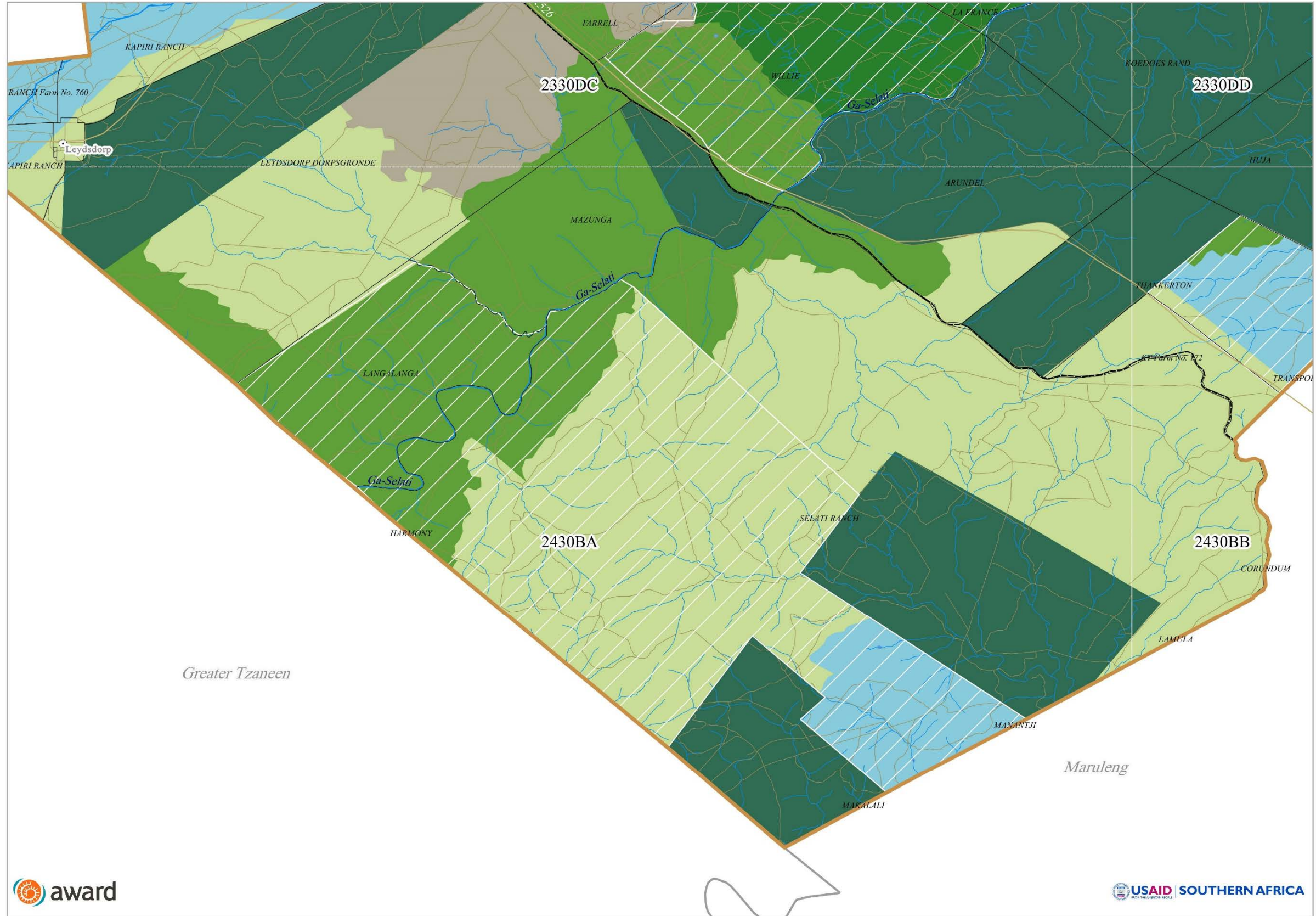


Tile 11: Vegetation map



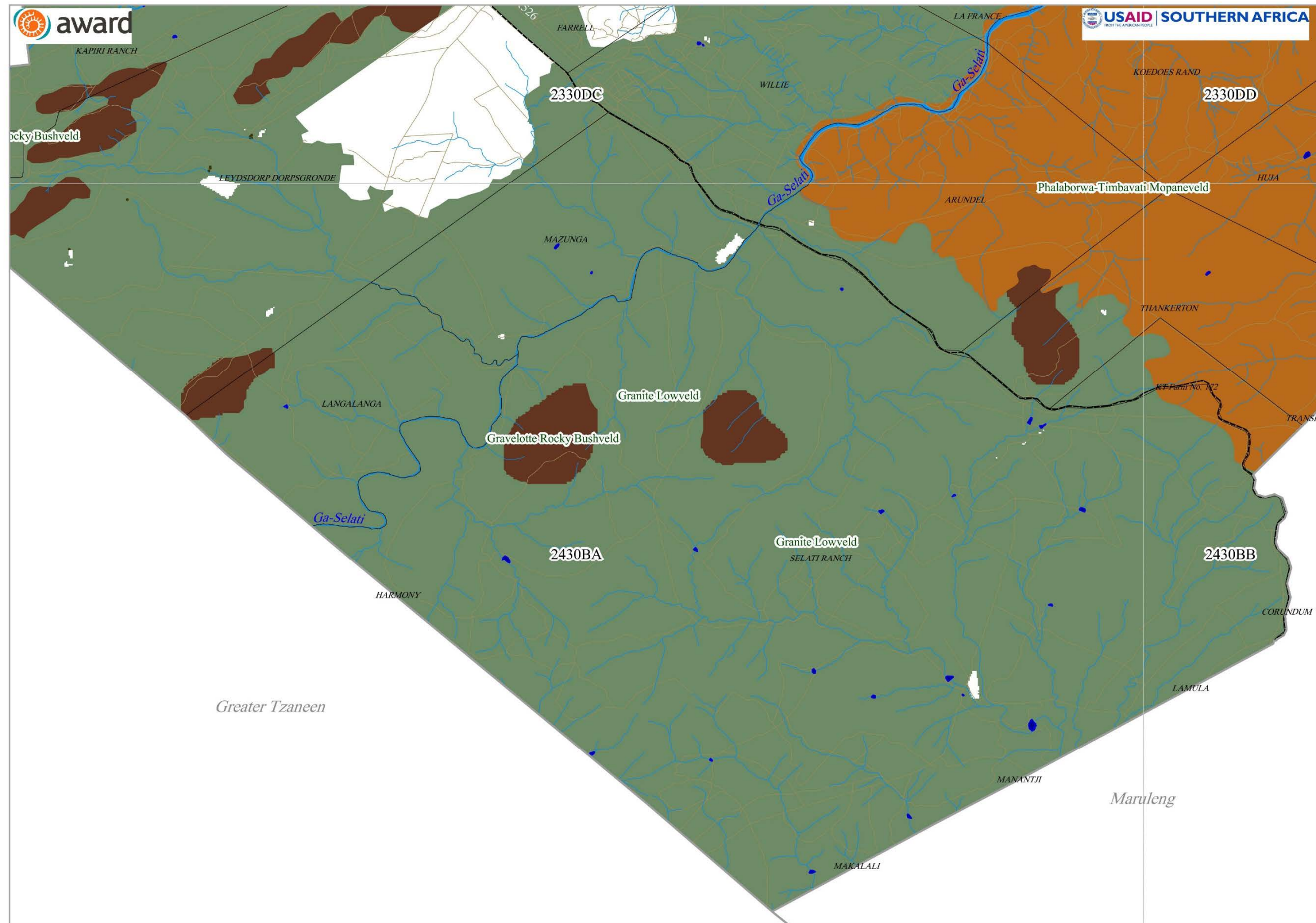


Tile 12: CBA map





Tile 12: Vegetation map



The Association for Water & Rural Development [AWARD]

AWARD is a non-profit organisation specializing in participatory, research-based project implementation. Their work addresses issues of sustainability, inequity and poverty by building natural-resource management competence and supporting sustainable livelihoods. One of their current projects, supported by USAID, focuses on the Olifants River and the way in which people living in South Africa and Mozambique depend on the Olifants and its contributing waterways. It aims to improve water security and resource management in support of the healthy ecosystems to sustain livelihoods and resilient economic development in the catchment.

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The CBA Mapbook is based on the STEP Mapbook (Pierce, S.M. 2006. The STEP Mapbook, part of the STEP Handbook. Integrating the natural environment into land use decisions at the municipal level: towards sustainable development. Centre for African Conservation Ecology Report Number 47 (Revised Edition). Nelson Mandela Metropolitan University, South Africa).

About USAID RESILIM-O

USAID: RESILIM-O focuses on the Olifants River Basin and the way in which people living in South Africa and Mozambique depend on the Olifants and its contributing waterways. It aims to improve water security and resource management in support of the healthy ecosystems that support livelihoods and resilient economic development in the catchment. The 5-year program, involving the South African and Mozambican portions of the Olifants catchment, is being implemented by the Association for Water and Rural Development (AWARD) and is funded by USAID Southern Africa.

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For Further information

Further information on the Geographical Information Systems (GIS) layers (maps) used to prepare the Critical Biodiversity Areas Map, plus electronic versions of the Biodiversity Sector Plan handbooks, and associated data, are available on DVD. Copies of the DVD can be obtained from:

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