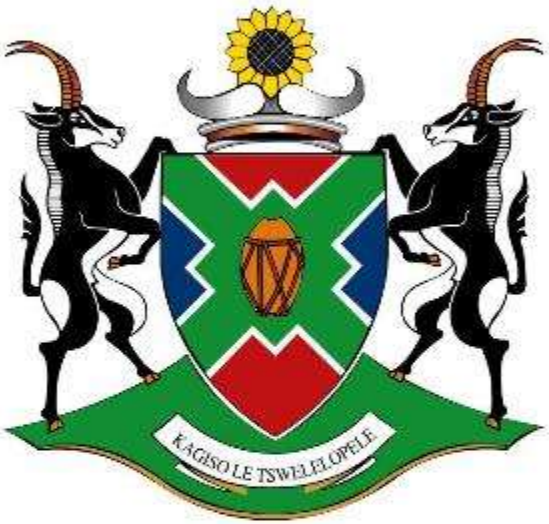

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SANBI'S BIODIVERSITY PLANNING FORUM: Wilderness Hotel 7-10th June 2016

Together moving the North West Province forward

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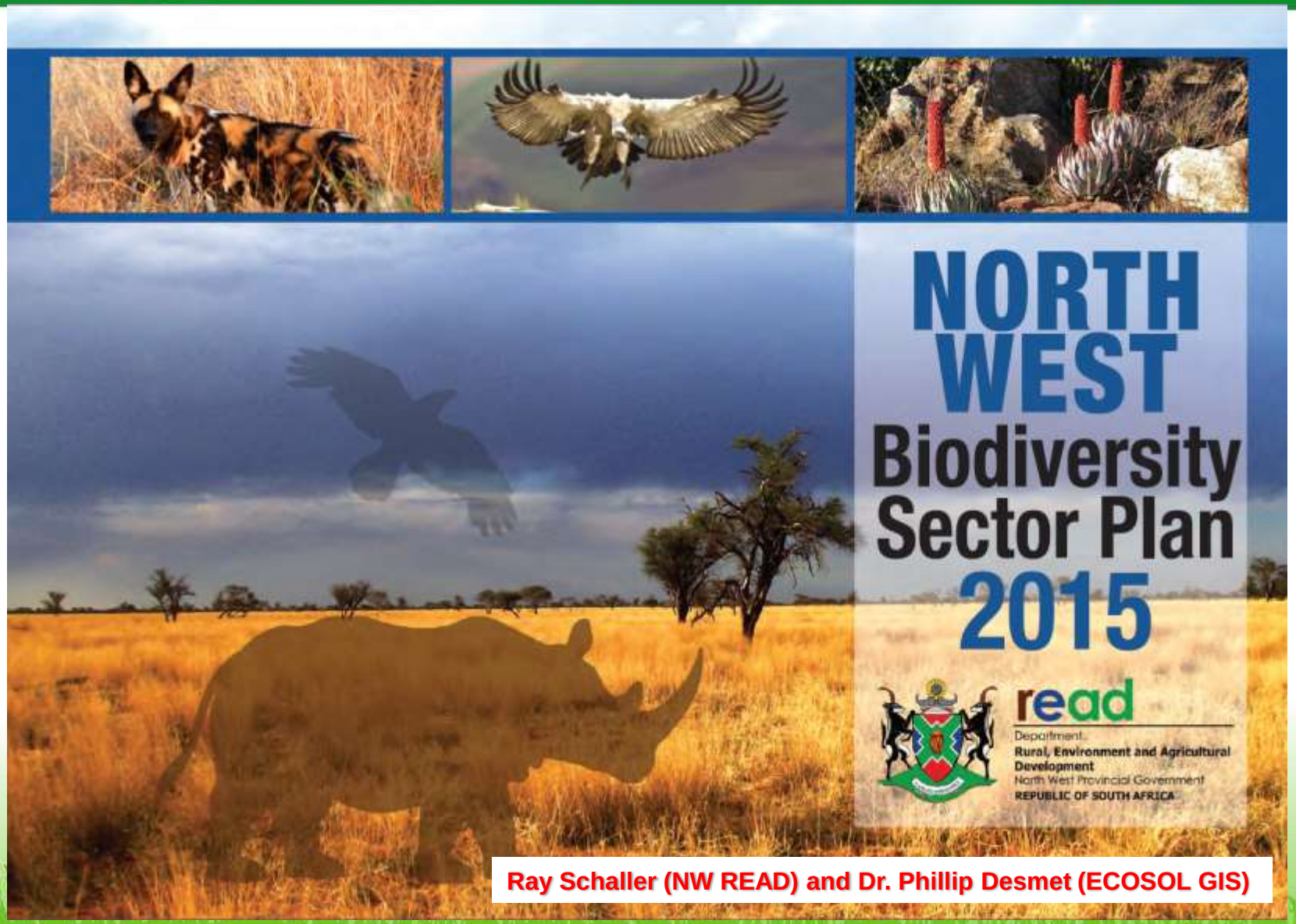


Ray Schaller (NW READ) and Dr. Phillip Desmet (ECOSOL GIS)

Overview of presentation

- What is the North West Biodiversity Sector Plan (NWBSP)
- Development of the Terrestrial and Aquatic Critical Biodiversity Areas Maps
- Land-use guidelines & products
- Measures for Biodiversity Management in the North West
- Mainstreaming the NWBSP 2015

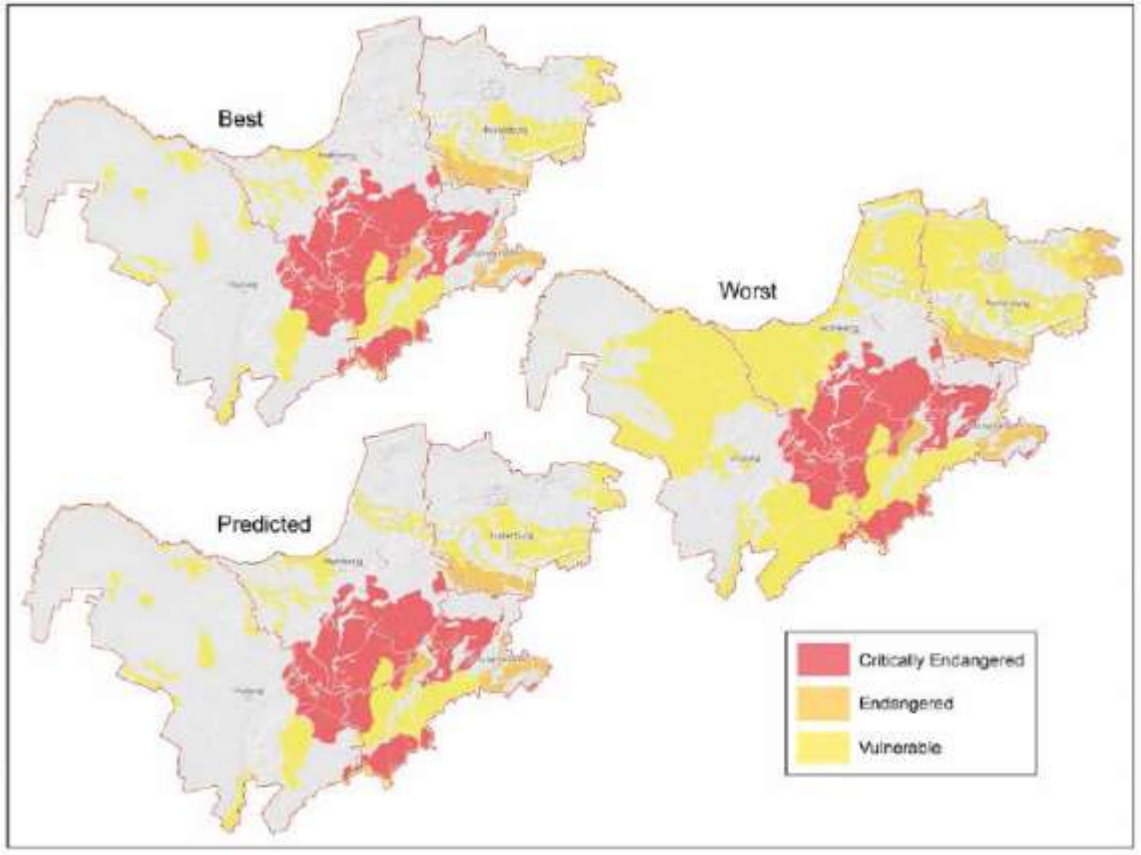
What is the North West Biodiversity Plan 2015

- A **forward planning tool** that will help government and society to better consider and incorporate a wide range of environmental considerations into development planning and execution.
- Integrates our **best available knowledge** on the environment and biodiversity in the province to identify a province-wide network of Critical Biodiversity Areas and Ecological Support Areas for land and water
- **Provides land use management recommendations** that define the minimum spatial and management requirements for a sustainable environment in the province

What does the BSP 2015 tell us?

- Approximately 35% of Province's natural ecosystems have been converted to other natural land uses.
- Between 1990 and 2014, 893 427 ha of the total province was converted to non-natural land uses.
  - Agriculture, through the conversion of natural veld to cultivation, accounted for about 71% of this change.
  - The rate at which the province is losing its natural habitat equates to 0.51% of the provinces total area per year. At this rate of conversion there will be no natural vegetation left in the province within 180 years.
- 11 of the 41 South African Vegetation Types are Threatened Ecosystems. A further two sub-types of the Highveld Alluvial Vegetation Type are also threatened

Ecosystem Threat Status of Vegetation Types in the North West



Aquatic Headlines:

- Aquatic biodiversity is high, with 98 wetland types and 35 river types present in the province.
- 52% of the wetland types and 80% of the river types classified as threatened.
- Several relatively pristine dolomitic eyes (springs) are supported in the province and a number of freshwater springs, lakes and waterfalls that have created very unique tufa systems are recognised to be of international importance.

Protected Areas

- The total area under conservation, i.e. validated protected areas (PAs) and conservation areas (CAs) amounts to 236,339 ha (2.25%). There are 15 Type 1 Protected areas i.e. statutory reserves, that cover 1.94% (203 259 ha) of the province.
- Ecosystems in the North West are not well represented within the protected area network. Of the 41 ecosystems (South African vegetation types) 22 are not protected at all, 14 poorly, 1 moderately, and only four are well protected.
- The least protected ecosystems in the NW are also the ones that are most threatened
- On DEA's SAPAD (Quarter 4, 2015) a total of 69 Private Nature Reserves, covering an area of 122 603 ha have been listed for the North West. Theses PNRs need to be validated in the field and many of them need to be deproclaimed.

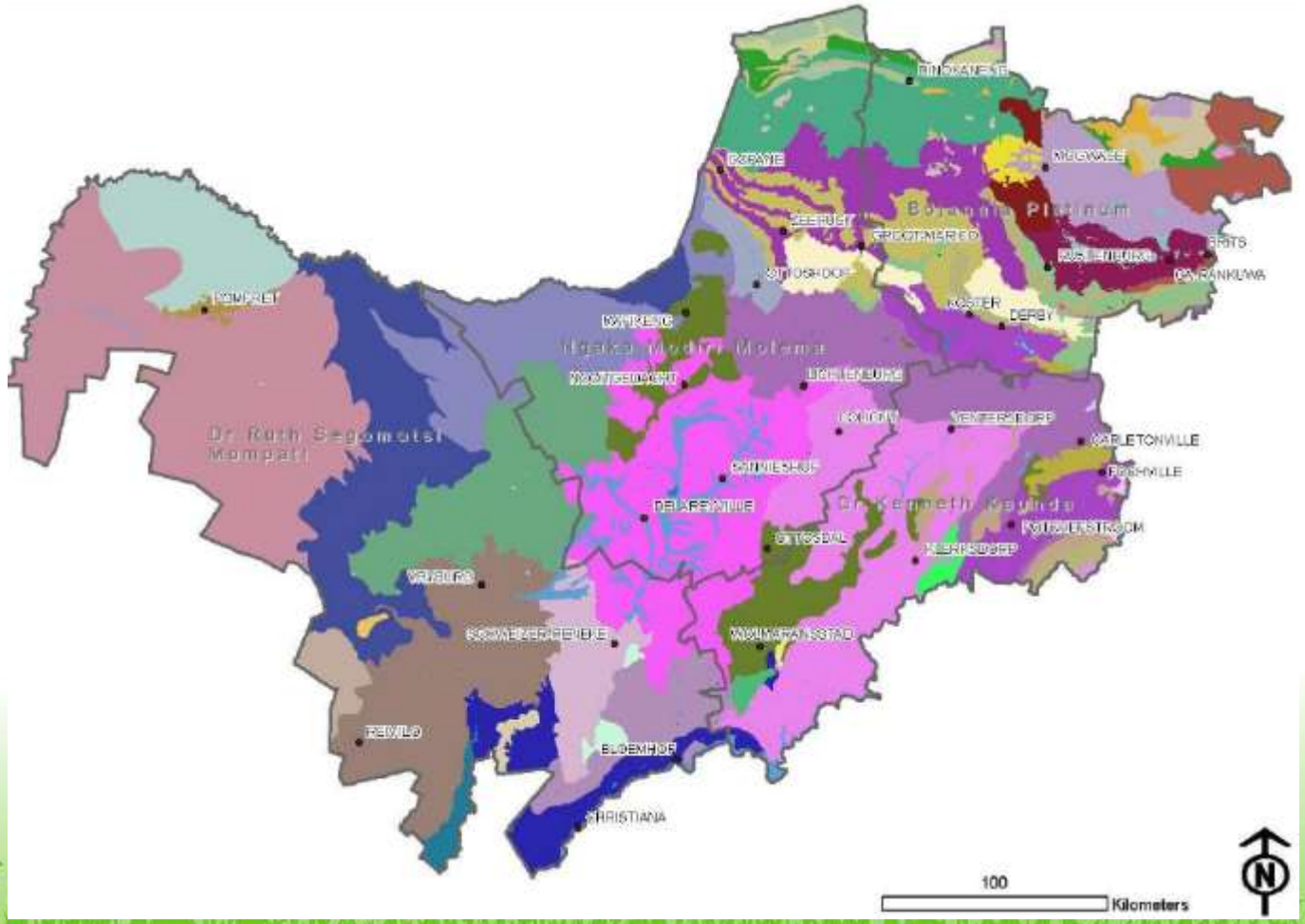
Vegetation Mapping

- A revision of the North West vegetation map was undertaken.
- Only boundaries were re-drawn and the current national vegetation classification was retained.
- Further numerical analysis of relevé data may require the creation of new units (e.g. *Olea schlerophyllous* forest in the Bankenveld) or the merging of two or more existing units into single units (e.g. Central Sandy Bushveld and Moot Plains Bushveld, or Mafikeng Thornveld and Kimberly Thornveld)

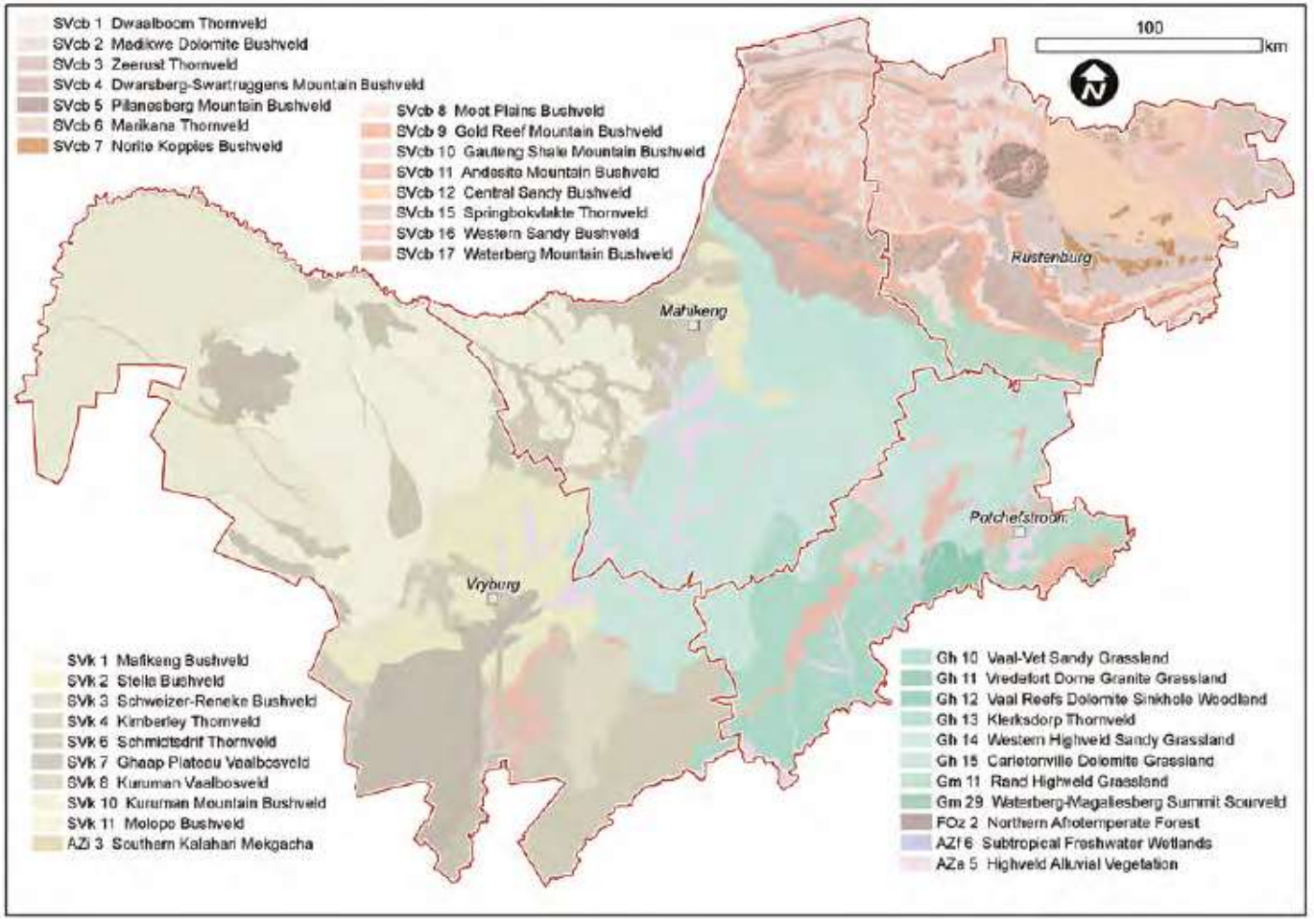
Vegetation Mapping Continued

- Vegetation unit boundaries were manually digitised from SPOT5 imagery with the following context layers as informants:
  - Generalised geology (1:250 000 Geoscience SAMINDABA vector data)
  - Agricultural 1:250 000 land types;
  - Agricultural 1:250 000 soil types;
  - Topographic position index calculated from the SRTM 30m DEM; and,
  - Existing vegetation map (Bredenkamp and Brown provincial map [Bredenkamp and Brown 2003] and the national vegetation map (Mucina and Rutherford, 2006).

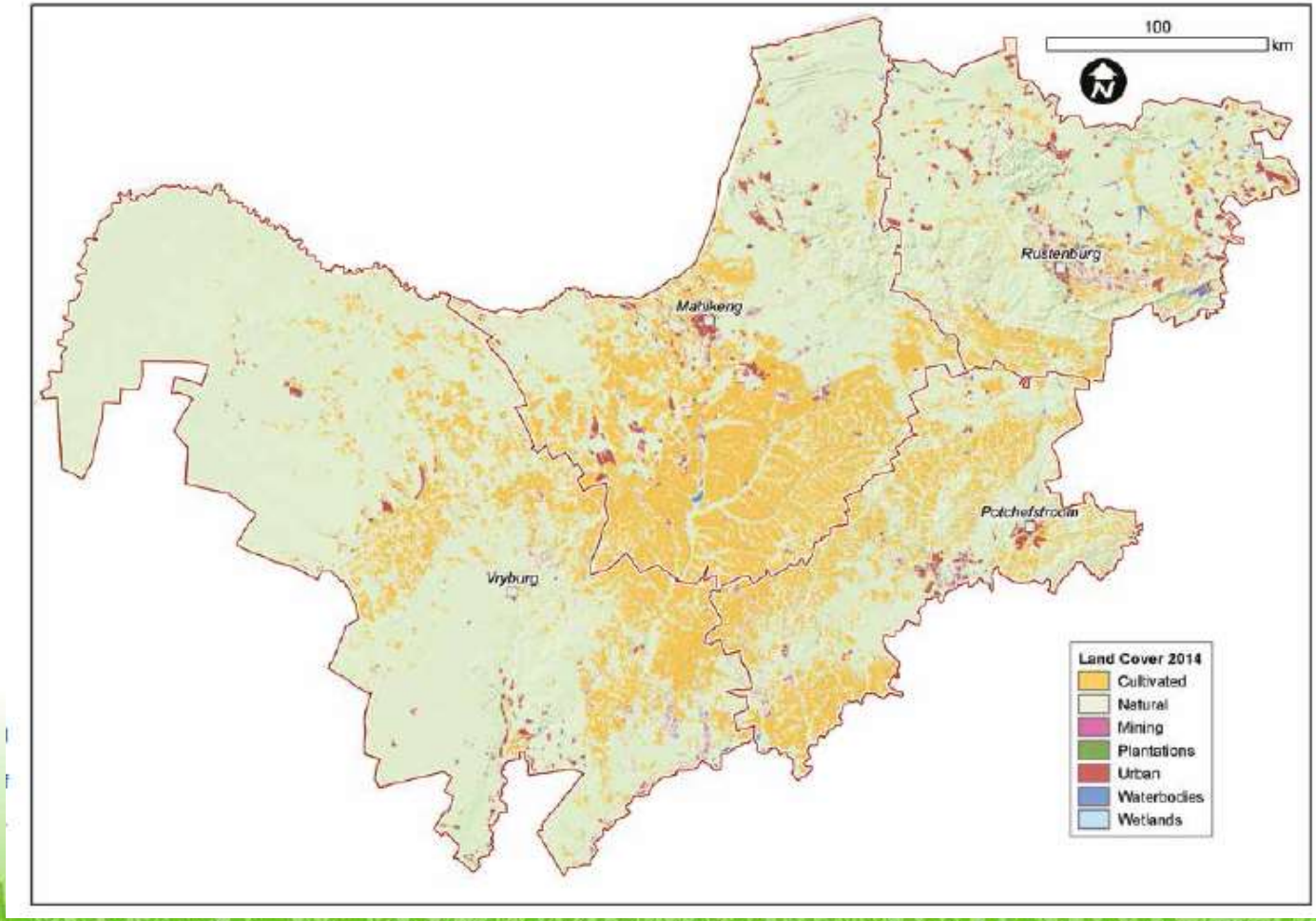
North West Vegetation Map (BCA 2009)



NW Vegetation Map 2015 (BSP 2015)



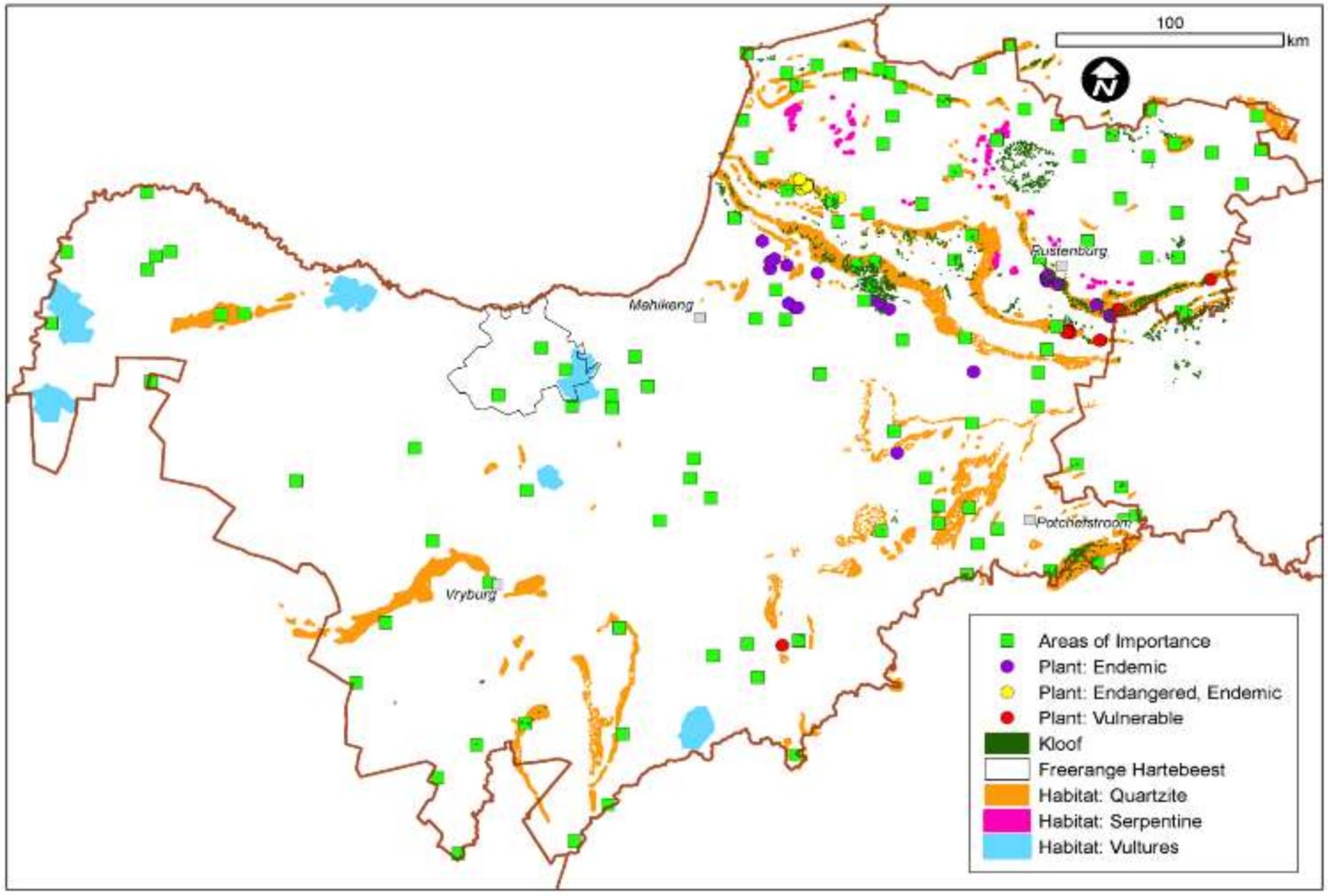
Integrated Land Cover (1990 (DEA); 1994 (CSIR); 2006 (DACERD); 2014 (DEA))



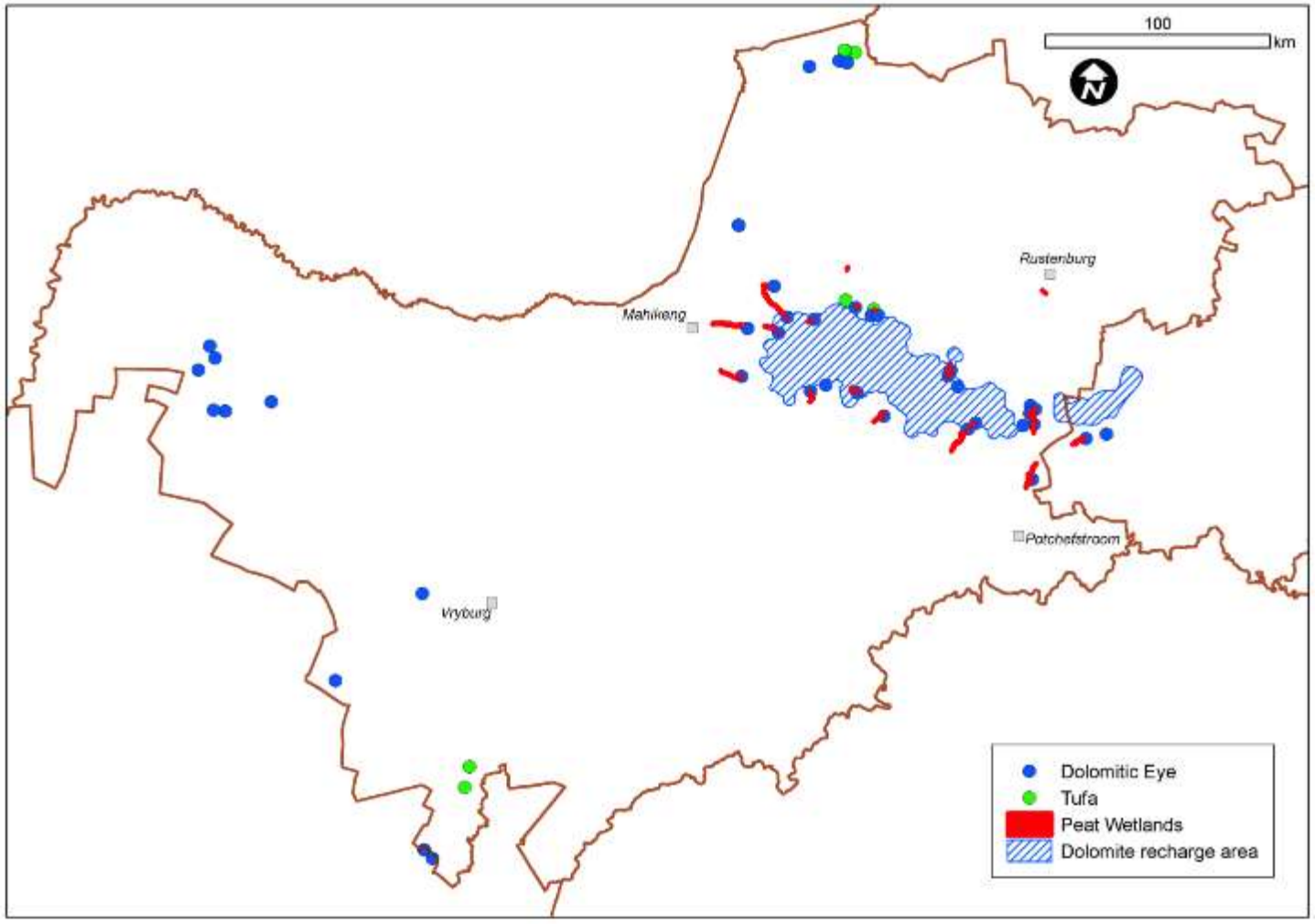
Mapping Aquatic Features:

Category & Data Layer Name	Input Layers:
Wetland Model	Analysis: Topographical wetland model created by Nacelle Collins based on the SRTM 90m DEM (ESRI's ArcGIS Toolbox: "Wetland_NW_SRTM_Radius_9")
PES: Rivers 500k	NFEPA/PESEIS rivers
Rivers DEM	Analysis: Modelled streams SRTM 30m DEM
Priority NFEPAs	NFEPA: catchments
Priority NFEPAs	NFEPA: free flow rivers
Priority NFEPAs	NFEPA: rivers
Priority NFEPAs	NFEPA: fish santuaries
Pans and Pan Clusters	Analysis: Topographic model using the SRTM 30m DEM to identify pans. To identify clusters, pans were buffered by 500m and grouped into contiguous pan/buffer polygons.
Tufa systems	Data capture: Expert mapping (Hermien Roux and Norbert Hahn) of known tufa systems. Captured as points features.
Dolomitic Eyes	Data capture: Expert mapping (Norbert Hahn and Philip Desmet) of known eyes and from NGI 250k and 50k maps
Fish species observation data	Neels Kleynhans (DWS) and Hermien Roux PESEIS "Smartie Box" Spreadsheet
Peat wetlands	Data capture: Expert identification (Hermien Roux and Philip Desmet) of peat wetlands followed by digitising of wetland area from Google Earth imagery
Streamlines	Analysis: Streamlines modelled from SRTM 30m DEM
Sub-Quaternary Catchments	Analysis: Sub-quaternary catchments (median size 1000ha and 5000ha) modelled from SRTM 30m DEM
Strategic Water Resource Areas	Analysis: Secondary analysis of pan clusters within the Malmane Karst geological system to identify linked pan clusters (1km buffer around pan clusters) with collective endorheig drainage overlying the karst landscape.

Expert Mapping: Terrestrial Biodiversity Features



Expert Mapping: Aquatic Biodiversity Features



Priority Biodiversity Area Mapping (CBAs and ESAs)

- Biodiversity features identified and mapped
- These biodiversity features became the basis for criteria used to define CBAs in the landscape.
- Each criterion was assigned a CBA category (CBA1, CBA2, ESA1 and ESA2) based on:
  - The biodiversity target set for a particular vegetation type;
  - The requirement to retain 100% of the remaining extent of a particular special feature intact to represent biodiversity; or,
  - The requirement of a feature to support ecological processes.

Priority Biodiversity Area Mapping (CBAs and ESAs) continued:

- All the polygon layers depicting the different map criterion with assigned CBA/ESA categories were then UNIONED
- Each resulting polygon was assigned for the purpose of displaying the highest ranking CBA category.
- It is important to note that in the resultant unioned CBA layer, any polygon can be positive for one or more CBA criteria.

Additional Map Criterion:

- Protected Areas
  - Protected Areas
  - Conservation Areas
- Other Natural Areas
- No Natural Habitat Remaining

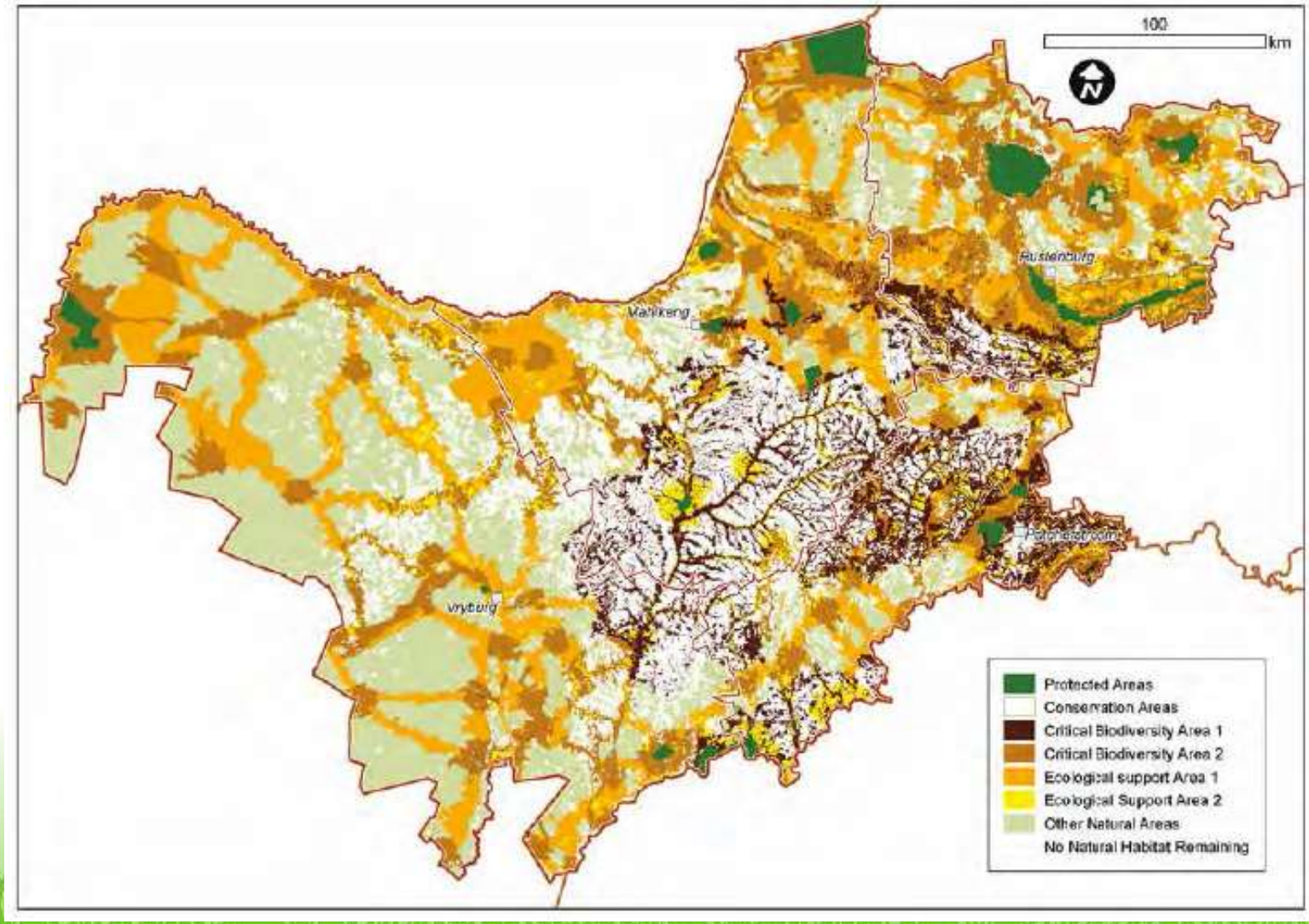
Terrestrial CBA and ESA Criteria:

Important fields	CBA Designation
CBA_T1: Critical Patches (Ecosystem status: Critical Endangered and Endangered	CBA1
CBA_T2: Hills & Ridges 2015	Major >10ha = CBA2, Minor < 10ha = ESA1
CBA_T3: Kloofs 2015	CBA1
CBA_T4: Important Bird Areas	ESA1 if natural, ESA2 if not natural
CBA_T5: Important Habitat – Free range Red hartebeest & Black Footed Cat (Kimberly Thornveld)	ESA1 if natural, ESA2 if not natural
CBA_T6: Expert Areas	NOT INCLUDED
CBA_T7: CORRIDOR (Selected planning units)	ESA1 if natural (ESA2 if not natural – Criterion 11)
CBA_T8: CRITICAL CORRIDOR linkages	CBA1 if natural, ESA2 if not natural
CBA_T9: CORRIDOR Nodes	CBA2 if natural, ESA2 if not natural
CBA_T10: PA buffers 5 km	ESA1 if natural, ESA2 if not natural
CBA_T11: CORRIDOR – Cultivated areas (Selected non-natural planning units (PUs))	ESA2
CBA_T12: Important Habitat – vultures (Selected PUs)	CBA2
CBA_T13: Important Habitats –plants (quartzites and serpentine areas, selected PUs)	CBA2
CBA_Disp: Highest ranking CBA category for map display	

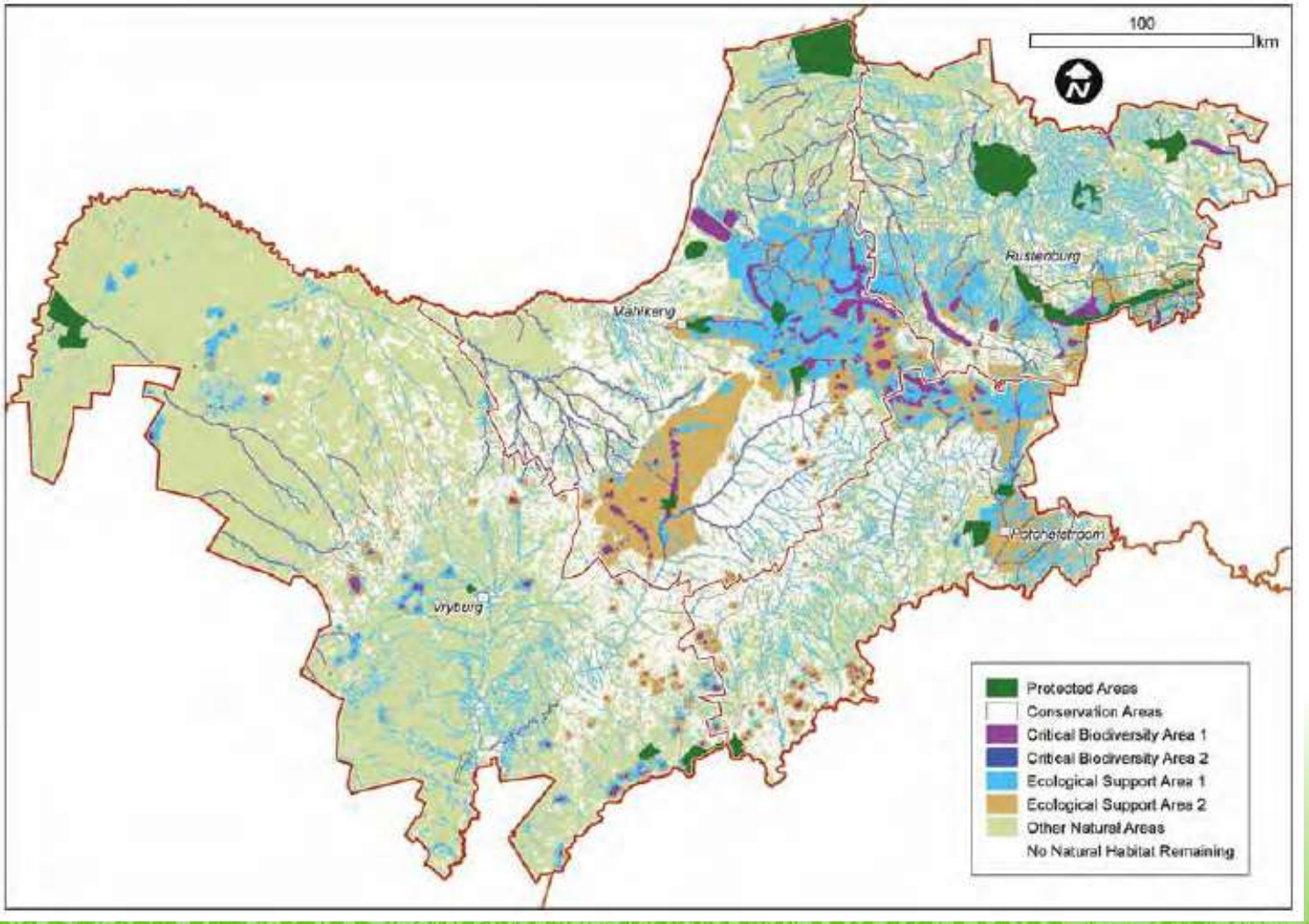
Aquatic CBA and ESA Criteria:

Important fields	CBA Designation
CBA_W1: CBA criterion: FEPA rivers (including FEPA rivers, Phase 2 FEPAs, Sanctuary and Free-flowing rivers) and river buffers (100m)	CBA1 (river) and CBA2 (buffer)
CBA_W2: CBA criterion: Modelled Instream wetlands	ESA2
CBA_W2_1: CBA criterion: Pans	CBA1
CBA_W3: CBA criterion: FEPA catchments	ESA1 if natural, ESA2 if not natural
CBA_W4: CBA criterion: Wetland clusters	ESA1 if natural, ESA2 if not natural
CBA_W5: CBA criterion: Dolomite recharge areas	ESA1 if natural, ESA2 if not natural
CBA_W6: CBA criterion: Peat wetlands	CBA1
CBA_W7: CBA criterion: Peat wetlands buffers	ESA1
CBA_W8: CBA criterion: Expert mapped areas from 2008 CBA map	CBA1
CBA_W9: CBA criterion: Dolomitic eyes and tufa 500 m buffer	CBA1 if natural, ESA2 if not natural
CBA_Disp: Highest ranking CBA category for map display	

Map of Terrestrial Critical Biodiversity Areas and Ecological Support Areas for the North West.



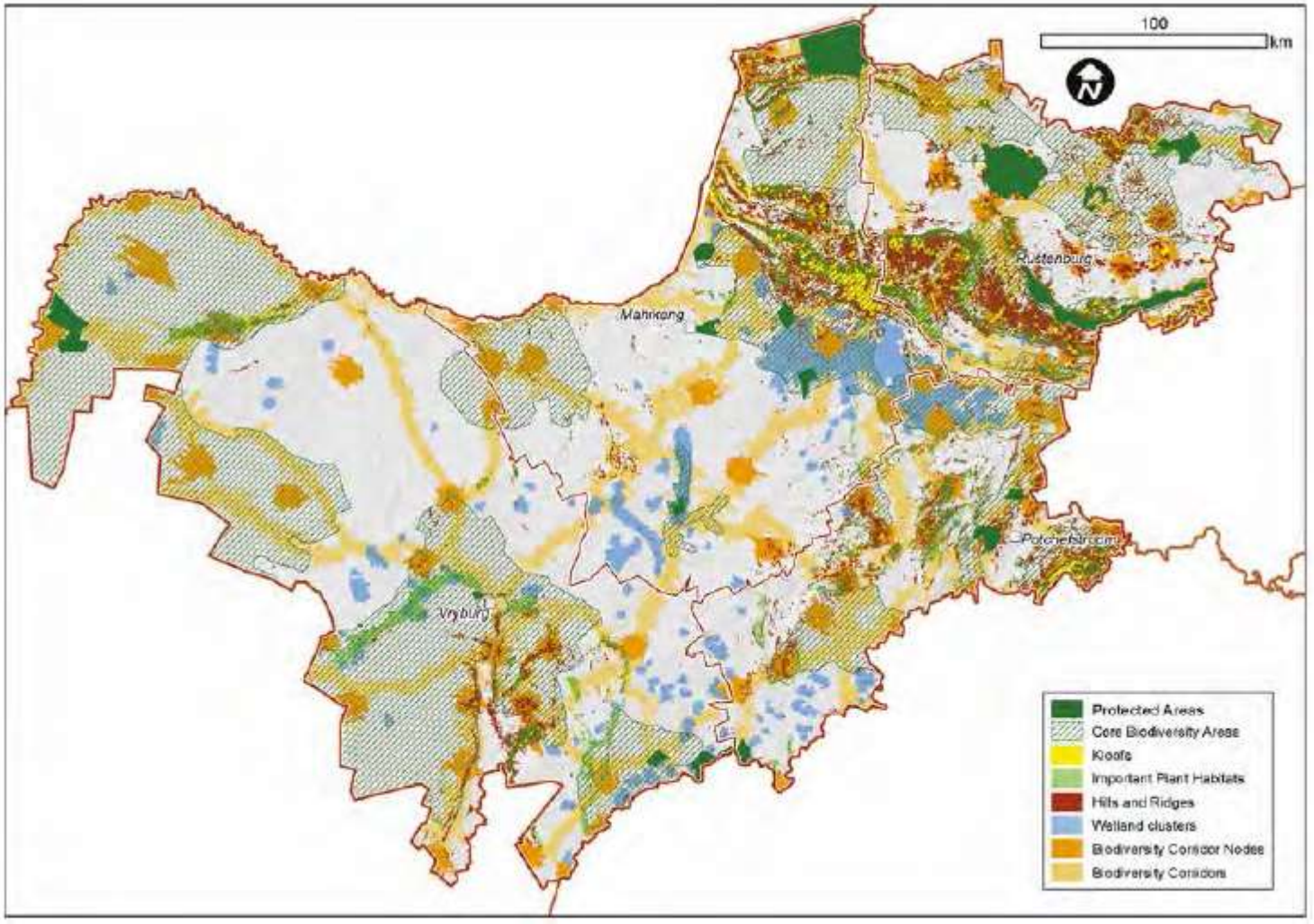
Map of Aquatic Critical Biodiversity Areas and Ecological Support Areas for the North West.



Identifying and mapping spatial areas that support ecological processes

- Retaining and protecting a provincial-wide network of intact and ecologically viable natural and near-natural habitats through land-use planning and regulation instruments is the cornerstone of any climate change adaptation strategy.
- Identifying and mapping spatial areas that support ecological process area
  - Landscape corridors
  - Core Biodiversity Areas
    - Large open landscapes with "wilderness "characteristics
    - The Core Biodiversity Areas mapped for the Province represent the generalised core biodiversity, environmental or green economy nodes that should be captured in SDFs (CBAs and ESAs)
  - Water-related Processes. Mapping ecological infrastructure that delivers water
    - Malmanie karst system that supports many of the dolomitic eyes
    - Magaliesberg Mountain range
    - Dolomitic Aquifers
    - Wetland systems

The Biodiversity Spatial Framework Map



Land Use Guidelines

- For each category on the Map of Critical Biodiversity Areas in the Province the BSP provides the following:
  - Land Management Objectives
  - Land Use Guidelines (with zones and associated activities)
- The land use zones have been aligned as far as possible with land use zones that are typically used in the development of land use schemes around South Africa, but more specifically the Mpumalanga Province (adapted from MTPA, 2014) i.e.
- LU zones was work shopped with relevant municipal Town & Regional Planners to ensure consistency and alignment.
- Guidelines Inform the development of municipal land use schemes in terms of the Spatial Planning and Land Use Management Act (No. 6 of 2013) (SPLUMA)

Land Management Objectives

CBA Map Category	Land Management Objective
Protected Area	As per protected area management plan
Critical Biodiversity Area 1 **(CBA 1)**	Maintain in a natural or near-natural state that maximizes the retention of biodiversity pattern and ecological process: • Ecosystems and species fully or largely intact and undisturbed. • These are areas with high irreplaceability or low flexibility in terms of meeting biodiversity pattern targets. If the biodiversity features targeted in these areas are lost then targets will not be met. • These are biodiversity features that are at, or beyond, their limits of acceptable change.
Critical Biodiversity Area 2 **(CBA 2)**	Maintain in a natural or near-natural state that maximizes the retention of biodiversity pattern and ecological process: • Ecosystems and species fully or largely intact and undisturbed. • Areas with intermediate irreplaceability or some flexibility in terms of meeting biodiversity targets. There are options for loss of some components of biodiversity in these landscapes without compromising the ability to achieve biodiversity targets, although loss of these sites would require alternative sites to be added to the portfolio of CBAs. • These are biodiversity features that are approaching but have not passed their limits of acceptable change.

Land Management Objectives

CBA Map Category	Land Management Objective
Ecological Support Area 1 (ESA 1)	Maintain in at least a semi-natural state as ecologically functional landscapes that retain basic natural attributes: • Ecosystem still in a natural, near-natural state or semi-natural state, and has not been previously developed. • Ecosystems moderately to significantly disturbed but still able to maintain basic functionality. • Individual species or other biodiversity indicators may be severely disturbed or reduced. • These are areas with low irreplaceability with respect to biodiversity pattern targets only.
Ecological Support Area 2 (ESA 2)	Maintain as much ecological functionality as possible (generally these areas have been substantially modified): • Maintain current land use or restore area to a natural state. • Ecosystem NOT in a natural or near-natural state, and has been previously developed (e.g. ploughed). • Ecosystems significantly disturbed but still able to maintain some ecological functionality. • Individual species or other biodiversity indicators are severely disturbed or reduced and these are areas that have low irreplaceability with respect to biodiversity pattern targets only. • These are areas with low irreplaceability with respect to biodiversity pattern targets only. These areas are required to maintain ecological processes especially landscape connectivity.
Other Natural Areas and No Natural Habitat Remaining	Production landscapes: manage land to optimize sustainable utilization of natural areas.

A subset of matrix of recommended land use zones and associated activities in relation to the CBA Map categories (adopted from MPTA, 2014).

No	Land Use Zone	Associated Land Use Activities	PA/CA	CBA1	CBA2	ESA1	ESA2	ONA
1	Environmental Conservation	Conservation management, low-intensity eco-tourism activities and sustainable consumptive activities.	Y	Y	Y	Y	Y	Y
2	Environmental Management Overlay Zone	These are areas that are designated as priority areas for protection, namely CBAs and ESAs; and can include CNAs.	N/A	Y	Y	Y	Y	N/A
3	Tourism and Accommodation	Low Impact Tourism / Recreational and Accommodation.	R	R	R	Y	Y	Y
		High Impact Tourism / Recreational and Accommodation (e.g. golf estates).	N	N	N	N	R	Y
4	Rural Residential	Low density rural housing or eco estates.	N	R	R	R	R	Y
		Traditional Areas (existing) and Rural Communal Settlement (New).	N	N	N	R	R	Y
5	Agriculture	Extensive Game Farming	R	Y	Y	Y	Y	Y
		Extensive Livestock Production	R	Y	Y	Y	Y	Y
		Game Breeding	N	N	N	N	N	Y
		Arable Land - Dryland and Irrigated Crop Cultivation	N	N	N	R	Y	Y
		Agricultural Infrastructure - Intensive Animal Farming (e.g. feedlot, dairy, piggery, chicken battery).	N	N	N	N	R	Y

Land use zoning categories and activity descriptions

LAND USE ZONE 1: ENVIRONMENTAL CONSERVATION

The Environmental Conservation zone provides for conservation purposes which includes a range of land use activities where biodiversity conservation is the primary land use objective.

<u>The Environmental Conservation zone includes</u>:

- **Conservation management activities in formal protected areas and informal conservation areas managed for biodiversity (wildlife production and recreational/educational tourism);**
- **Low-intensity eco-tourism activities (such as hiking trails); and**
- **Sustainable consumptive activities (e.g. sustainable harvesting of natural resources such as medicinal plants), conducted in natural habitats on public or private land.**

This land use zone corresponds to the SPLUMA scheduled land use purpose 'conservation purpose'.

These land use activities provide the following:

- **Protection of the natural environment and natural processes for their historic, scientific, landscape, biodiversity, habitat, or cultural values.**
- **Provision of facilities, which assist in public education and the integration of the built and natural environments, with minimal degradation of the natural environment or natural processes.**
- **Creation of a holistic framework where culturally significant and historical sites are accorded equal status and value along with new developments.**
- **The sustainable provision of ecosystem services to the community.**

Subject to appropriate controls, planning and management, these land use activities can be accommodated in CBAs and ESAs. It is the preferred land use in CBAs, ESAs and some ONAs. Where there is a requirement to use natural resources, this should be proven to be sustainable. This would include the concept of catchment management and protection for water security.

Adopted from the Mpumalanga Biodiversity Sector Plan handbook (MPTA, 2014).

General Land Management Guidelines

- The BSP also includes general land management guidelines for CBAs and ESAs, e.g. Guidelines for managing loss of natural habitat in CBAs include:
  - Further loss of natural habitat should be avoided in CBA 1, whereas loss should be minimized in CBA 2 i.e. land in these two categories should be maintained as natural vegetation cover as far as possible.
  - CBA 1s and CBA 2s not formally protected should be rezoned where possible to conservation or an appropriate zoning, and where possible declared in terms of the Protected Areas Act.
  - CBA 1 and CBA 2 can act as possible biodiversity offset receiving areas.
  - The provincial biodiversity stewardship programme may wish to prioritise privately owned properties in CBA 1s and CBA 2s to be incorporated into the protected area network through biodiversity stewardship agreements. The provincial protected area expansion strategy to use the CBA Map in prioritising these areas.

Additional Guidelines:

- The BSP 2015 includes a set of guidelines to evaluate environmental impact assessments (EIAs), basic assessments, agricultural land use permits, water use licensing decisions and development control decisions through land use legislation (e.g. rezoning and sub-division approvals
  - NW has not yet developed minimum requirements / ToR for ecological assessments to inform the EIA application process, but recommends that the ToR for ecological assessments by Botanical Society of South Africa (Conservation Unit) be followed.
- The BSP includes a guide to incorporating the BSP into IDPs and SDFs. The BSP 2015 has been incorporated into the PSDF review process

Additional Features

- The handbook ends with a chapters on monitoring, reviewing and updating the BSP.
- Accompanying the BSP Handbook, is a Technical Document that includes:
  - Detailed biodiversity profile for the Province
  - A prioritised list of recommendations for continued or new activities aimed at developing, implementing and mainstreaming the BSP. High priority tasks include
    - Development of a nationally accepted and scientifically valid provincial vegetation map
    - Update CBA map with results of a MARXAN analysis

Mainstreaming the BSP 2015

- Incorporating the BSP 2015 into spatial plans, i.e. SDFs, EMFs etc.
- Distribution of products:
  - Handbook
  - Technical Document
  - Posters
  - Information DVD incl. GIS Layers, GIS Viewer, Pdf versions and supporting documentation
  - Information pamphlets
- Uploading of products to BGIS
- Workshops:
  - Internal (Scientific Services, Environmental Officers)
  - External (EAPs, municipalities etc.)
- Development of a Web-based Map Viewer (Windows and Android)

THANK YOU

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