MINING WITHIN PROTECTED ENVIRONMENTS WITHIN MPUMALANGA PROVINCE

ABSTRACT
An expert panel review on issues surrounding mining in Protected Environments, with specific reference to Yzermyn in the Mabola Protected Environment, Mpumalanga.

Note: Confidential. For internal use – MTPA board.

March 2015

Compiled by Emross Consulting Pty. Ltd.
www.emross.co.za
Acronyms used

CBA Critical Biodiversity Area
DEA Department of Environmental Affairs
DMR Department of Mineral Resources
DO Dissolved oxygen
EC Electrical conductivity
ESA Ecological Support Areas
FEPA Freshwater Ecosystem Priority Area
GEF Global Environmental Facility (fund)
MPAES Mpumalanga Protected Area Expansion Strategy
MPE Mabola Protected Environment
MTPA Mpumalanga Tourism and Parks Agency
NEMA National Environmental Management Act
NEMPAA National Environmental Management: Protected Areas Act
NFEPAA National Freshwater Ecosystem Priority Areas
NPAES National Protected Area Expansion Strategy
NSS Natural Scientific Services (Yzermyn EIA consultants)
PAG Potential acid generation
pH Measure of Hydrogen ion in solution - how acidic or basic a solution is.
SANBI South African National Biodiversity Institute
TDS Total dissolved solids (water quality measure)
WfWet Working for Wetlands
WWF World Wide Fund for Nature - NGO
1. Introduction

Mpumalanga Tourism and Parks Agency (MTPA) called for a report to assist and advise the MTPA Board on mining within protected environments within Mpumalanga Province. Questions arose following the application to mine in the recently proclaimed Mabola Protected Environment (MPE). This report is aimed at addressing the key questions in this regard, posed by the MTPA Board, namely:

1. Status around mining in a declared protected environment.
2. Was the declaration of the Mabola Protected Environment well founded?
3. What would be the magnitude, scale, duration and permanence of impacts on biodiversity, water yield and quality, agricultural and tourism potential of the proposed Yzermyn coal mine in the Mabola Protected Environment?
4. What may the social, political and legal consequences be, locally, regionally, nationally and internationally, of de-proclaiming the Mabola Protected Environment to allow mining to take place?

The report considers each of these in turn (although the order of questions 3 and 4 are swapped). Followed by a set of recommendations. The Issues are looked at initially from a broader national perspective (although local examples are used) and then later focusing into the issues particular to the Mabola Protected Environment. Each component has had input from a team of experts with legal, mining, biodiversity, wetland, social and other expertise.

It is intended that this report will provide not only advice, but assist in building capacity and developing policy for the future management of similar situations.

2. Overview - mining in a protected environment

This section answers the question:

What is the status around mining in a protected environment?

The purposes of proclaiming an area as a Protected Area is defined within Section 17 of National Environmental Management: Protected Areas Act (NEMPAA). There are various forms of protected areas, one of which is a Protected Environment.

The purpose of a protected area is to protect ecologically viable areas representative of South Africa’s biological diversity and natural landscapes, preserve the ecological integrity, biodiversity, environmental goods and services, sustainable use of natural resources, augment destinations for nature based tourism amongst other purposes.
A Protected Environment may be declared in order to enable landowners to take collective action to conserve biodiversity and seek legal recognition thereof, protect an area if it is sensitive to development due to its biological diversity and natural characteristics or if there is significant scenic and landscape value or provision of environmental goods and services.

A key legislative guide is NEMPAA where part 4 of the Act considers restrictions on activities within a protected area, and section 48 specifically regards mining in a protected area. Section 48 of the NEMPAA prohibits commercial prospecting, mining, exploration, production or related activities in special nature reserves, national parks and nature reserves. Section 48(2), however, permits mining in protected environments with the written permission of the Minister of Environmental Affairs and the Minister of Mineral Resources. The section, and the Act as a whole, provide no guidance on what the process of seeking written permission should look like and under what circumstances the Ministers will give such written permission.

In considering what mining would look like in a protected environment, it is helpful to first consider the default position for mining. With the new amendments that came into effect in December 2014, the environmental authorization process for a prospecting or mining right application is governed by chapter 5 of the NEMA. Whether the mining right is compliant with these requirements is determined in the first instance by the Department of Mineral Resources (DMR). Appeals of these decisions go to the Minister of Environmental Affairs.

A concrete difference is therefore the decision-maker. In a normal application, the decision is taken by a DMR official, with a primary mandate to facilitate and encourage mining. However, in a section 48(2) decision, the Minister of Environmental Affair’s primary mandate is conservation.

A related distinction is emphasis. In a normal application, the environmental authorization process is primarily geared towards a consideration of how environmental harm can be mitigated. While an application may conceivably be refused outright because of the sensitivity of the environment, this is a rare occurrence. DMR is unlikely to refuse mining licenses and is often seen as having the position that all impacts are mitigatable. In a NEMPAA section 48(2) decision, however, the onus is shifted. As can be seen from the language and structure of section 48, the default position is that no mining should be allowed.

With no concrete statutory guidance, when will the Minister of Environmental Affairs accept that mining should be allowed in a protected environment? The starting point is, of course, a consideration of the facts of the individual mining application. The lower the projected environmental impact, the greater the likelihood of approval. Another factor is the Minister will not ignore the potential social and economic benefits the proposed mine may bring.

This balance will be considered within a framework of national and provincial strategies and policies that will guide the Minister. These include, but are not limited to, the national and provincial protected area expansion strategy, the Mpumalanga Biodiversity Sector Plan, payment for ecosystem services, Agricultural Policy of South Africa, tourism, National Climate Change Response Policy, National Water Strategy, Municipal Spatial Development Framework Plans and Environmental Management Framework Plans. South Africa is also a signatory to the following international agreements: Convention on Biological Diversity, Convention on Wetlands of International Importance especially as Waterfowl Habitat (also known as the Ramsar Convention on Wetlands), Millennium Development
Goals and others which in turn require responsible action and inform South African environmental Legislation.

The more central the Protected Environment to the above policies and strategies, the less likely the Minister will be to approve of the mining application. If a protected environment is more peripheral to the conservation strategy, the Minister may be more likely to approve of the mining.

The central questions in considering whether the Minister may approve of mining in a protected environment are therefore:

- What are the social and economic benefits arising from the proposed mining?
- What is the likely environmental impact of the proposed mining?
- To what extent will this environmental impact undercut national or provincial policies and strategies for conservation?

As Protected Environments were only introduced as a mechanism for environmental conservation in the NEMPAA, there have not been any section 48(2) approvals to date. It therefore remains unclear what procedure will be followed in considering section 48(2) applications, what time frames will govern the Minister, and the extent to which the cumulative impacts of these decisions will be considered.

The form of mining under section 48(2) is also uncertain, but there are two potentially important differences that may have a significant impact: the placing of conditions on mining and section 102 applications.

Under the ordinary mining rights application process, certain conditions can be placed on mines to enhance conservation. More robust conditions have given rise to litigation whereby the mining companies seek to have these conditions set aside. Section 48(2) would certainly empower the Minister to place conditions on mining companies that could be more robust than those imposed by the DMR and less subject to contestation.

Section 102 of the MPRDA empowers mining companies to apply to the Minister for Mineral Resources for amendments to their mining rights, including amendments to their mining work programmes, their social and labour plans, and their environmental authorisations. As these applications should generally be for minor changes, they are not subject to the same procedural requirements as initial mining applications. They are, however, sometimes used for more substantial amendments that could conceivably include changes to work programmes around the mitigation of environmental harm or to environmental authorisations. Under section 48(2), the Minister of Environmental Affairs could require that all section 102 applications relating to mining in Protected Environments be subject to the approval of both the Minister of Environmental Affairs and the Minister of Mineral Resources.
Mining and Biodiversity Conflict in Mpumalanga

In considering the policy framework in which the Minister will consider section 48(2) applications in Mpumalanga, the Mpumalanga Biodiversity Sector Plan and the Mpumalanga Protected Area Expansion Strategy are particularly relevant.

• Mpumalanga Biodiversity Sector Plan

The Mpumalanga Biodiversity Sector Plan is a broad conservation planning tool which is informed by systematic planning and achieves “the most spatially efficient way of safeguarding a representative sample of biodiversity that is able to persist on the least amount of land possible, whilst avoiding conflict between biodiversity objectives and other and uses” (MTPA, 2014).

Outside of existing protected areas, 19% of the province is designated as Critical Biodiversity Areas (CBA’s), of which 9.6% of the province is classified as CBA: Irreplaceable. A number of the protected areas would potentially also classify as CBAs if they were deproclaimed, such as Verloren Valei Nature Reserve. An Irreplaceable status implies that no other portions of land are available to achieve these biodiversity targets and thus none of this land can be transformed to land uses that result in biodiversity loss. This also implies that an offset is not a feasible option. A comparison of the location of mineral deposits and CBA: Irreplaceable land in Mpumalanga shows an extensive area of overlap in the eastern Mpumalanga Highveld between Carolina in the north and Wakkerstroom in the south. Any mining activities that result in biodiversity loss, particularly habitat transformation, will result in the province not being able to meet biodiversity targets. This is particularly relevant to temperate grassland habitats on the Highveld that appear to be impossible to restore to original state and would most likely be irreversibly lost.

Another biodiversity conflict would be within the MBSP category “Ecological Support Area: Strategic water source areas”. These strategic water producing or high water production areas produce over 50% of the province’s mean annual run-off and are of critical importance in maintaining stream-flow and water quality. Mining activities within these catchments have a high risk of compromising the ecological integrity, water quality and quantity, and biodiversity of these water source areas and downstream river reaches.

• Mpumalanga Protected Areas Expansion Strategy

The Mpumalanga Protected Area Expansion Strategy (MPAES) serves to function as a provincial framework for an integrated, co-ordinated and uniform approach in the expansion and consolidation of the Provincial PAS, in line with the requirements of the National Protected Area Expansion Strategy (NPAES). According to the NPAES a total area of 6 320km² of Mpumalanga needs to be incorporated into protected areas in order to meet the 20 year national target for Protected Area expansion and 1 520km² is needed to meet the 5 year target. Primary objective and current focus of the MPAES is to establish protected areas within Priority 1 Areas (= Areas within the MPAES that overlap with the NPAES). Three of the seven major concentrations of Priority 1 areas identified in Mpumalanga occur in the grasslands of the eastern Mpumalanga Highveld (Figure 1) where mining potential is high and risk of biodiversity conflict is high. These are viewed as focal areas for establishing protected areas in the next 5-10 years. The MTPA has identified Biodiversity Stewardship as the primary mechanism to meet these protected area expansion targets.
3. The declaration of the Mabola Protected Environment

This section answers the question:

Was the declaration of the Mabola Protected Environment well founded?

Section 28(1) of the NEMPAA empowers the Minister or an MEC to declare a protected environment by notice in the Gazette. Section 28(2) provides that this power may only be exercised if certain requirements are met and provides a closed list of these requirements. These requirements include, inter alia:
1. To enable landowners to take collective action to conserve biodiversity and seek legal recognition (s 28(2)(b)).
2. To protect an area if it is sensitive to development due to its biological diversity and natural characteristics (28(2)(c)(i-ii)).
3. To protect an environment if there is significant scenic and landscape value or provision of environmental goods and services (section 28(2)(c)(iv-v)).

It should be noted that the Act only requires one of these conditions to be present for a declaration to be valid.

Before turning to analysing the declaration of the Mabola Protected Environment, it is important to briefly note that section 7(1) of the Promotion of Administrative Justice Act (“the PAJA”) requires that an administrative action, such as the proclamation of a Protected Environment, may only be set aside if it is challenged within 180 days. This section therefore does not contemplate whether the proclamation may be subject to an administrative review by a court.

The PAJA does not, however, curtail the MEC’s powers to deproclaim a Protected Environment as this would be a new administrative action. A valid ground for deproclamation would be that the area does not meet the substantive requirements for proclamation. It is important to note, however, that it is not open to the MEC to deproclaim Mabola on the basis of discontent with the procedure by which it was proclaimed as this would be a review of the proclamation itself and is therefore blocked by the PAJA.

The following section therefore considers whether the declaration of the Mabola Protected Environment was substantively well-founded in terms of these requirements. The focus is on the merits of the landscape (ecological and environmental) and whether it was suitable for consideration of Protected Environment status.

Locality of Mabola Protected Environment
The Mabola Protected Environment (MPE) falls within the Pixley ka Seme Local Municipality on the southern boundary of Mpumalanga and Kwa Zulu Natal Province. The Mabola Protected Environment is situated on the watershed between the Usutu and the Pongola Catchments. It rises from the foothills of the Assegai River at an altitude of approximately 1340m to over heights of over 2000m above sea level in the mountains above Wakkerstroom.

Collective Conservation by Land Owners
Before turning to the merits of the biodiversity of the Mabola Protected Environment, it is important to note that one of the requirements under section 28(2) is objectively established in that the landowners within Mabola have taken collective action to conserve the biodiversity of the area. This commitment is not a light one; their rights to do as they please with their property are meaningfully limited by the regulations around land use in a Protected Environment.
Identification of MPE as an area of Biodiversity Importance:
The biodiversity importance of the broader Wakkerstroom area, including the Mabola Protected Environment, has been known for some time, but was highlighted in being identified as an Important Bird Area in 1998, as an area of predominately "High Intrinsic Biodiversity Value", an area identified as "Important and Necessary", "Highly Significant" and "Irreplaceable", identified as a "Protected Area Expansion Focus Area" in the National Protected Area Expansion Strategy, as mainly a "Priority 1" and "Priority 2" in terms of the MPAES and as a Critical Biodiversity Area in the MBSP.

Of the two main biomes withinMpumalanga, the Savannah Biome is protected beyond its targets through the Kruger National Park, while the Grassland Biome is poorly protected; thus, over 91% of the new protected areas have to be acquired within the Grassland Biome in order for biodiversity targets to be achieved.

Primary objective and current focus of the MPAES is to establish protected areas within Priority 1 Areas (= Areas within the MPAES that overlap with the NPAES). Of the seven Priority 1 areas identified in Mpumalanga, the grassland escarpment in southern Mpumalanga (from Wakkerstroom north to Sheepmoor) has been identified as one of these areas, and is highlighted as one of the focal areas for establishing protected areas in the next 5-10 years. (See figure 1 above – areas G & F)

The MTPA has identified Biodiversity Stewardship as the primary mechanism to meet these protected area expansion targets. The stewardship programme provides a mechanism for the state to secure the protection of the land without having to purchase the land, which it would be unable to afford. A Protected Environment declaration allows the land to remain productive through the continued use of environmentally compatible land use practices and within various other land use limitations as set out in the MPAES.

Spatial Importance of MPE
The spatial context of proclaiming the Mabola Protected Environment is important. The KwaMandlangampisi Protected Environment has been proclaimed to protect important biodiversity, ecosystem functions and provide a buffer around the Paardeplaats Nature Reserve. Whilst there are additional areas of biodiversity and ecosystem value immediately to the north and east of the KwaMandlangampisi, these areas do not provide the critical linkages to other areas of high biodiversity and ecosystem importance identified to the west and north west of the KwaMandlangampisi Protected Environment. The proclamation of the Mabola Protected Environment not only protects important biodiversity and ecosystem features, it also provides the critical linkages to other areas of
conservation importance, thus preventing fragmentation of habitats and enhancing the conservation value of the connected areas (Figures 2 and 3).

Figure 2. Important biodiversity linkages for the Mabola Protected Environment. Map shows the intact grassland patches and climate change supporting corridor network that were developed and used within the Mpumalanga Biodiversity Sector Plan for Mpumalanga Province.

Figure 3. Important biodiversity linkages depicted on the Mpumalanga Biodiversity Sector Plan illustrating connectivity value of the Mabola area.
Terrestrial Importance

Threatened Ecosystems

The MPE is situated within a gazetted (GNR No 1002 of 9 December 2011) Threatened Ecosystem, the **Wakkerstroom / Luneberg Grasslands Threatened Ecosystem**, an area of largely untransformed critical habitat for numerous threatened and near threatened flora and fauna. Two vegetation types predominate in the MPE, namely Wakkerstroom Montane Grassland (Least Threatened) and Paulpietersburg Moist Grassland (Vulnerable) both of which are poorly represented in protected areas within Mpumalanga. Continued transformation of these grasslands will elevate their required conservation status to threatened.

Critical Biodiversity Areas

Approximately two-thirds of the MPE have been designated as either Optimal (important and necessary) or Irreplaceable Critical Biodiversity Areas, i.e. areas that are essential for meeting biodiversity targets for species, ecosystems or ecological processes, while much of the northern third of the MPE is classified as an Ecological Support Areas (ESA): Local Corridor^6. This is an area that is not essential for meeting biodiversity targets, but supports the functioning of adjacent CBAs and is important for ecosystem service delivery. In addition, the MPE provides connectivity between vast areas of Irreplaceable CBAs to the south and other CBAs to the north.

Species of Conservation Concern

- At least 43 plant species of conservation concern and 135 protected plant species occur in the general vicinity of the MPE, of which two Vulnerable species, namely *Aloe modesta* and *Helichrysum aureum var. argenteum*, have been confirmed on several of the MPE properties, as well as one Near Threatened species, four Declining species and three Rare species.
- Twenty-five conservation-important mammal species have been confirmed to occur within the quarter-degree grids in which the MPE is situated, five of which are threatened. Of these, only Oribi (Endangered) has been recorded within the MPE, while Swinny’s Horseshoe Bat (Endangered) and Rough-haired Golden Mole (Vulnerable) occur on adjacent properties.
- The MPE is situated within the vast Grassland Biosphere Reserve Important Bird Area, which supports viable populations of at least 24 threatened and 20 Near Threatened bird species. Two Endangered bird species have been confirmed on adjacent properties, namely Grey Crowned Crane and Rudd’s Lark, while four Vulnerable species have been confirmed within the MPE, namely Southern Bald Ibis, Secretarybird, White-bellied Korhaan and African Grass Owl.
- Five reptiles of conservation concern potentially occur in the MPE, of which Short-headed Legless Skink (Vulnerable) and Cape Grass Lizard (Near Threatened) have been confirmed. Two frogs that have provincial status of Vulnerable occur either within the MPE or on adjacent properties: Natal Ghost Frog and Karoo Toad.
So from a terrestrial biodiversity conservation perspective, the declaration of the MPE was also well-founded.

**Hydrological Importance**

The Mabola Protected Environment straddles three water catchments namely the Assegai, Thaka (Buffels) and Phongola River systems. The greater part of the MPE area falls within the Assegai River catchment, an important part of the Heyshope Dam catchment. The most southern part of the conservation area falls within the upper reaches of the Thaka River catchment and the proclaimed Wakkerstroom Wetland RAMSAR site is found downstream in this reach. A section of the protected area also occurs within the watershed between the Assegai River and the Phongola River catchments.

From a water resource perspective, the Mabola Protected Environment is perfectly located to conserve and protect the ecological integrity of the above mentioned river systems. It is crucial to maintain the integrity of these river systems and to manage it in order to provide a healthy sustainable supply of water to important downstream users.

**Biogeographical Characteristics**

The biogeographical differences within the above mentioned catchments are evident, which requires a separate discussion for each system.

**Assegai River System:**

Quaternary catchment W51A forms part of the Upper Usutu Sub-Water Management Area, which is part of the Usutu to Mhlaluze Water Management Area. The National Freshwater Ecosystem Priority Areas project (NFEPA) provides Freshwater Ecosystem Priority Area (FEPA) maps showing rivers, wetlands, and estuaries that need to remain in a good condition to conserve freshwater ecosystems and protect water resources for human use. According to these maps, most of the wetlands within this quaternary catchment are wetland FEPA. Several landforms are present as per the hydromorphological classification with seeps, channelled valley bottoms, and flats being prominent. Most of the wetlands have been classified as being in a “natural or good” condition. The NFEPA project has also ranked wetlands according to their biodiversity importance. Most wetlands within the study area have a rank of 2 based on one or more of the criteria used by Nel et al., because the sub-quaternary catchment contain wetlands of biodiversity importance, wetlands that are good, intact examples and where sightings of Cranes are recorded.

The Assegai River system feeds into the Heyshope Dam. Sustained flow of high quality water to this dam is important, not only to supply good quality water as part of its Inter-Basin Transfer values, but also for its value as a bird paradise. This dam with its 110km shoreline hosts high numbers of water birds. Bird numbers regularly recorded for this dam are between 7000-8000 individual birds. The inlet of the Assegai River to this dam created a vast wetland area with unique habitat that hosts several African crowned cranes (endangered) and a variety of many other water birds.

A variety of wetlands occur in the Assegai River catchment and the most dominant are channeled and un-channeled valley bottom wetlands, seep wetlands connected to a stream, and those not connected. The transition between the grasslands and wetlands is described as Hygrophilous.
Grassland. This consists of soils that are temporarily flooded and host facultative to facultative dryland species. It is expected that the Present Ecological Status and the Ecological Importance and Sensitivity of these wetlands will be high due to their setting in a protected area and the good management support provided by local farmers. The high integrity of these wetlands can also be ascribed to strong groundwater resources being present, which serve as replenishing water sources for the wetlands in this catchment. These wetlands depend on lateral ground water support, and this is a key driver for their high integrity. (NB. These lateral groundwater flows would be severely impacted in mined areas).

Although the Assegaaai River wetlands do have a high ecological integrity there are several impacts on these wetlands that contribute to current and possible future degradation. Impacts include:

- Stands of alien invasive species such as Populus x canescens and Populus deltoides, Acacia mearnsii (Black Wattle) and Acacia melanoxylon (Australian Blackwood).
- Hardened surfaces, for example dirt roads traversing wetlands, and associated erosion.
- Rill and donga erosion.
- Overgrazing and trampling (resulting in preference flow conditions) in some areas.
- Grazing and incorrect burning regimes can decrease vegetation cover and may contribute to increased erosion.

**Thaka River System:**

The size of the overall Utaga River catchment is approximately 15,600 ha and there are eight recognisable sub-catchments. Begg (1986) estimated the average annual water yield from this catchment to the Wakkerstroom Wetland to be 30 million cubic meters (mean annual run-off, MAR=30MCM). The Wakkerstroom Townlands (4006 ha) cover the largest single portion of the catchment and provide a quarter of the water to the wetland (Tarboton, 1998). The Wakkerstroom Wetland is important for maintaining the quality of water supplied to the Zaaihoek Dam located further downstream.

A total of six wetland types occur in the catchment, such as valley bottom floodplains, un-channelled and channelled valley bottoms, seep wetlands connected and those not connected, and fountains (artesian springs at places) which all contribute towards a high biological diversity.

Unique wetland systems occur in this catchment such as the Wakkerstroom Wetland which is a 700 ha wetland containing Phragmites spp. reed beds (37%), bulrush-sedge marsh (30%), dry grassland (17%), ‘wet’ grassland (14%) and Carex spp. marsh (2%), much of which are waterlogged for most of the season. The wetland is important as it contains the second largest number of breeding pairs of crowned cranes of any wetland in South Africa and a possible 7 pairs of white winged flufftails.

The Wakkerstroom Wetland is a valley-bottom fen (of peat composition) and contains up to 2 440 000 m³ of peat with an average thickness of 0.5 m. A peat thickness of 2.8 m was recorded, but some references quote sediment levels as deep as 6 m. The wetland can also be described as a tall-emergent fen (Grundling & Marneweck, 1999). The peatland was dated at 780 ± 60 BP at a depth of 2.2 m in the main basin. The relatively high accumulation rate of 2.82 mm/year, when compared with rates of 0.18 – 0.66 mm/year for the dolomitic type peatlands reflects the immature nature of the peat in a thick acrotelm. The acrotelm is the active surface layer where the decay of biological-
matter is taking place. The peat can be described as a reed-sedge peat, very fibrous to medium fine grained in texture (Grundling & Marneweck, 1999).

Why are peat wetlands important? Fifty percent of all the wetlands in the world are peatlands, and most of these are located in the Northern Hemisphere. Only one percent of all peatlands occur in Africa and South America collectively (Lapaleinen, 1996). Peatlands are, therefore, a rare feature in the southern African landscape. Peatlands or mires are fresh water wetlands, which develop in areas where precipitation exceeds potential evapotranspiration and where the drainage of surface water is restricted, creating a net water surplus. As a broad estimate, a soil type may be considered as a peat soil if it has more than 20 – 35 % organic matter on a dry weight basis (Mitsch and Gosselink, 1986).

The Wakkerstroom Wetland is so unique that it qualifies for Ramsar Status\textsuperscript{15} in complying with 5 out of the 8 criterion:

- **Criteria code 1**: Wetland contains representative, rare or unique examples of a natural or near-natural wetland type found within the appropriate biogeographic region.
  
  The settings of this wetland is rare and unique in the North-eastern Sandy Highveld (Acocks Veldtype 57). A total of six wetland types occur in this floodplain system. Of these the most important are the relative young peatland wetland and un-channeled marsh wetland types. This wetland is also in a good ecological condition thus together with the rare and unique setting providing reason to its high conservation value.

- **Criteria code 2**: Wetland supports vulnerable, endangered or critically endangered species or threatened ecological communities.
  
  Because of its geographical location and variety of ecological habitats, Wakkerstroom Wetland Reserve supports an appreciable number of wetland related rare, vulnerable or endangered species. These include 3 Red Data plant species, 3 Red Data bird species and 2 Red Data and 4 IUCN Red listed mammal species.

- **Criteria code 3**: Wetland supports populations of plants and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
  
  Many wetland related endemic plants and animal species occur on the Wakkerstroom Wetland Reserve, including 2 plant species, two bird species, and three mammal species. It should be noted that endemicity is regional and/or national and not site specific.

- **Criteria code 4**: Wetland supports plants and/or animals species at a critical stage in their life cycles or provides refuge during adverse conditions.
  
  Without the freshwater wetland, the Grey Crowned Cranes would not be able to breed successfully. This wetland has the second largest single breeding group of Grey Crowned Cranes (\textit{Balearica regulorum}) in South Africa. This habitat thus has a special functional value as it provides the cranes with suitable nesting sites and habitat in which to rear their young. Other wetland bird species, notably the White-winged Flufftail (\textit{Sarothrura ayresi}), which is one of Africa’s rarest bird species and was once thought to be extinct in South Africa, make use of this wetland during their annual visit to Southern Africa.
• Criteria code 6: Wetland regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

The wetland hosts the second largest single breeding group of Grey Crowned Cranes (*Balearica regulorum*) in South Africa and host 4 pairs of Whitewing Flufftails (*Sarothrura ayresi*). This wetland will support >1% of these individuals in a population of one species of waterbird.

The wetlands in the catchment provide grazing for cattle and goats, water abstraction for domestic use, cutting of reeds for the making of curios, building material, fishing and recreation (Birdwatching, hiking, horse riding, etc.). The surrounding catchment provides stock farming (mainly sheep), cultivation, and dams for water use, fishing and recreation.

Impacts such as drainage channels, headcut erosion, reed spraying for fire breaks, fragmentation of wetland due to roads crossing the wetland and uncontrolled fires degrade wetland areas. Negative influences in the catchment includes erosion, overgrazing, building of dams (potential threat), building of weirs, exotic invasive vegetation, etc.

**The Phongola River system:**

This part of the protected environment is located on the watershed between the Assegai and Phongola river systems. Although it is positioned on one of the highest points of the protected environment area (elevation 1858 m) it still host one of the most interesting wetlands in the area. An isolated depression area (pan feature) occurring on this plateau is the only of its kind in the Mabola Protected Environment. This unique feature host a variety of diversity and attract many cranes in the area. Other wetlands in this area are seep wetlands feeding into water courses downstream.

**Wetland Functions**

Wetlands in the upper reaches of these catchments perform important functions to support their ecological integrity, such as:

- **Flood attenuation** - Water from high runoff areas is slowed down and held back, particularly during the summer rainfall season (September - March). Without this slow down effect the run-off from precipitation can cause extensive erosion and river bank incision, leading to siltation of downstream wetland systems, affecting the ecological and hydrological functioning of these systems. This function also aids in maintaining a sustainable stream flow, especially during the dry winter season, thus ensuring that the hydrology and ecology of the downstream wetlands remain functional during low or zero rainfall periods.

- **Sediment trapping** - Any sediment washed down by precipitation would be effectively trapped ensuring that good water quality is maintained downstream.

- **Recharge and discharge of ground water** – This takes place particularly during the dry winter months (April - August). The wetlands act as sponge like areas and store and release water on a sustainable basis, ensuring a regular supply of water to downstream users.

These functions provide important social, agricultural and economic benefits through the provision of clean water, sustained water flows and reduced infrastructure flood damage.
The protective Environment footprint occurs in a high water-production area that caters for the continuity of water flow. Special and unique wetland types occur in some of these properties, which include peat wetlands (mainly occurring in valley bottom areas), preferential recharge areas, seep wetlands, and riparian wetlands. It is therefore important to emphasize that the Mabola Protected Environment does contribute to the integrity of this catchment that will underwrite through longitudinal hydrological processes the ecological health of the important wetland features downstream!

Wetland conservation programmes

The Working for Wetlands (WfWet) programme, which was initiated in 2000, identified the Wakkerstroom-Luneburg wetlands as an important priority to restore and rehabilitate wetlands. The WfWet programme is a combined initiative of the Department of Environmental Affairs, Department of Tourism, Department of Agriculture Forestry and Fisheries, and Department of Water Affairs and is housed within the South African National Biodiversity Institute (SANBI). The approach adopted by the Working for Water programme, and similarly WfWet, has been compared with the concept relating to payment for ecosystem services, where voluntary payment, in this case, government funding, is made available for defined ecosystem services. WfWet, however, uses wetland rehabilitation rather than alien invasive plant clearing as the mechanism to achieve the overriding objectives of the programme. The purpose of the WfWet programme is described as follow: “to champion the protection, rehabilitation and sustainable use of South Africa’s wetlands through co-operative governance and partnerships”.

The Mabola Protected Environment occurs within the focal area of future wetland rehabilitation and the planning for rehabilitation in the W51A Quaternary catchment has begun. The focal wetland area for rehabilitation is the Nauwgevonden Wetland system, located on the Nauwgevonden 131 HT farm. This wetland occurs in the South Eastern corner of the W51A Quaternary, draining North East to the Assegai River, feeding into the Heyshope Dam. This wetland lies next to the turnoff from the R543 road between Wakkerstroom, Dirkiesdorp and Luneburg.
It is critical to preserve the wetlands in the area and to rehabilitate those that may have been degraded by past farming or mining / quarrying practices. Future planning for wetland rehabilitation will continue to pursue priority wetlands in the W51A Quaternary catchment with special focus within the footprint of the Mabola Protective Environment. If mining is allowed, the wetland rehabilitation projects will be of no value.

Water Quality and Quantity
Water quality and quantity are both critical, particularly as Heyshope dam is used for inter-basin transfers, the majority of which is for Eskom power stations and is required to be high quality.

*Heyshope to Grootdraai Transfer Scheme*2
Water is transferred from Heyshope Dam in the Upper Usutu Catchment to the Upper Vaal Water Management Area, with a capacity of 10 m³/s, currently limited to 3,8 m³/s.

The Heyshope System consists of the Heyshope Dam and the Geelhoutboom Balancing Dam, with pumps and canals system transferring water from the Heyshope Dam in the Assegai River to the Upper Vaal Water Management Area, as well as to Morgenstond Dam in the Usutu River basin. The main purpose of the Heyshope Dam is to support the Grootdraai Dam in the Vaal River Basin and also to support the Usutu System in critical periods with transfers to Morgenstond Dam. Grootdraai Dam is mainly used to supply the Sasol Secunda Complex and Eskom power stations in the Upper Olifants Catchment.
The catchments discussed are important in a broad context as they are in a high water yield area (figure 5) and are important as water flows in Mpumalanga and neighbouring countries.

The run-off in the Heyshope catchment (W51) is as high as 264mm, producing nearly three times the national average of river run-off across the whole area. Recent studies on aquatic biodiversity conservation have delineated a staggering 70% of the total area to be considered as National Freshwater Ecosystem Priority Areas (NFEPAs).

High quality water is becoming increasingly important in the power generation in South Africa as, ironically, many of the dams near the existing power stations have become too polluted by the mining activities nearby to be suitable for use in power generation facilities.

**Founding of the Mabola Protected Environment**

From the brief overview provided above, it is clear that the Mabola area contains significant terrestrial and hydrological biodiversity and ecosystem functions (ecological infrastructure). The land owners within the Protected Environment have voluntarily diminished their property rights to collectively protect the area’s biodiversity. The area has been identified at both a national and provincial level as an important area for conservation and protected area expansion. The area therefore meets the criteria contemplated in the NEMPAA for Protected Environments. In addition, the location of the MPE
forms critical linkage in the biodiversity corridors envisaged in the conservation planning for the province. It is the view of the authors that the identification and proclamation of the Mabola Protected environment is well founded.

4. Potential consequences of de-proclamation of a Protected Environment

This section answers the question:

What may the social, political and legal consequences be, locally, regionally, nationally and internationally, of de-proclaiming the Mabola Protected Area to allow mining to take place?

This panel has been asked to assess the social, political and legal consequences of deproclaiming the Mabola Protected Environment. In order to set out the overall framework in which this assessment must occur, this section begins by setting out the legal position before turning to consider the social and political consequences. Based on the previous section, this section assumes that the proclamation of the Mabola Protected Environment was well founded.

Legal

NEMPAA provides little guidance on the legal requirements for the deproclamation of a protected environment. Section 29 provides merely that the MEC may by notice in the Gazette “withdraw the declaration, issued under section 28, of an area as a protected environment.”

Section 32 requires the MEC to undertake a consultation process that includes engaging with: affected bodies of national, provincial and local government; all lawful occupiers or rights holders of land in the affected area; and the general public in terms of section 33.

While the power in terms of section 29 appears to be unfettered, it must be exercised rationally. Given the public consultation process, as well as the heightened level of media attention to the Mabola Protected Environment, it is likely that a whole or partial deproclamation would lead to prolonged litigation that would require the MEC to give full reasons for the deproclamation.

As discussed above, the primary rational basis for deproclaiming a Protected Environment is that it does not meet the requirements for protection under the NEMPAA. As the Mabola Protected Environment’s proclamation has been shown to be justified, this basis for deproclamation is not on the table.

If the reason for deproclamation is to enable mining, this will be subject to intense scrutiny given the MEC’s primary mandate is conservation.
In terms of the position of the mine, deproclamation would still leave mining subject to the environmental protections arising out of the NEMA, the MPRDA and other legislation. As is illustrated in section 5, a review of the documents submitted to support the Yzermyn underground coal mine’s application suggests that a responsible approach to understanding and modelling the technical issues and suggesting mitigating measures where impacts are inevitable. However, there is no assessment made of the cumulative impacts and required mitigation actions. In addition, there is limited assessment of impacts and risks if models don’t hold true (of which there is no guarantee).

The National Environmental Management Act (Act No. 107 of 1998) (NEMA) embeds the legal requirement for EMFs. It requires the compilation of information and maps that specify the attributes of the environment that must be taken into account by every competent authority. The EMF regulations promulgated under Sections 24(5) and 44 of the NEMA, specifies the contents of an EMF. The Mabola area is noted in the Pixley Ka Isaka Seme Local Municipality EMF as having significant biodiversity, important ecological corridors and that it is unsuitable for mining (land use guideline table on pg 88 of EMF report). The EMF is a critical decision support tool aimed at managing resources.

Social and political

The social impact of deproclamation would be felt on different levels and not only in the Mabola area, but downstream too. The land owners and communities that have been expecting to benefit from the Mabola Protected Environment, who have participated in meeting and signed agreements, and have passed up opportunities of alternative development will, at the least, feel that they have been mistreated and mislead. This will then lead to the likelihood that future land owners will not be interested in offering their land to be incorporated into protected environments. This would impact both current national protected area expansion projects as well future options. This point is particularly salient as the expansion of South Africa’s protected areas will be prohibitively expensive if private landowners are not part of the expansion strategy.

The ecological services provided by the area would be at risk and this could negatively impact on land tenure, security, cultural heritage and sense of place. This would in turn impact more widely on areas such as tourism – both direct and areas supporting nature tourism. It would also lead to a decrease in the long term confidence in the local tourism industry and this can lead to various employment decrease scenarios.

The potential biodiversity loss and risk of fragmentation would be of considerable concern, including the potential to fail to achieve a minimum size for reserve sustainability. This situation would be most acute if only a portion of the MPE was deproclaimed (partial deproclamation).

The Mabola specifically, and the Mpumalanga Grasslands in general have attracted local and international funds for projects aimed at their conservation and protection. These have come from funders such as the Global Environmental Facility and often channelled through NGO’s like WWF and state entities such as SANBI. These projects have often focussed on local indigent communities. The deproclamation of the MPE will create a negative perception within the foreign funding agencies of the conservation efforts in South Africa. This would not only affect the work that has been done in the Wakkerstroom area (e.g. US$ 8.3m Global Environmental Facility (GEF) funded for the Wakkerstroom-Luneburg Agriculture Demonstration Project), but may affect other projects within the country such
as the Protected Area Expansion Project funded by GEF (US$56m project value). Donors don’t like to see their considerable funds wasted.

WWF-SA comment on the deproclamation of protected environments.

WWF-SA together with other organisations (including provincial authorities), have worked hard at protecting representative habitat and strategic water source areas that provide irreplaceable ecosystem services. The monetary investment from WWF-SA is conservatively estimated at over R8 million for its biodiversity stewardship initiative in Southern Mpumalanga and Northern KZN. In addition, the significant investment from SANBI’s grassland programme in pioneering and expanding biodiversity stewardship with WWF-SA in Mpumalanga amounts to substantially more. The de-proclamation of the Mabola Protected Environment (MPE) would set an extremely dangerous precedent for conservation in general and would furthermore jeopardize the gains achieved over the last 5 years in the biodiversity stewardship space. The National Protected Area Expansion Strategy (NPAES) and the National Environmental Management Protected Areas Act (NEMPAA) would lose credibility if Protected Environments were de-proclaimed in favour of mining interests. The notion of a right to an environment that is not harmful is a Constitutional one that needs to be tested and preserved. The ability for us as a collective, to make the wisest decision with regard to the future of the MPE is now being tested and WWF-SA urges the various decision makers to maintain the protected area status of the MPE and act decisively in preventing incompatible land use activities such as mining from taking place therein.

WWF-SA statement provided on 25th March 2015

The deproclamation would also place government in a position where different departments are working against each other. With SANBI (under DEA), Water Affairs & Sanitation and Eskom (under the Department of Public Enterprise) working against the Department of Mineral Resources.

Climate change

The deproclamation of a PE for coal mining purposes goes against South Africa’s goals of fighting Climate Change. The deproclamation of MPE would result in the very areas needed to act as refugia for Climate Change mitigation being mined for coal, which is one of the major contributors to Climate Change. The broadcasting of this within the environmental lobby groups would create a public liaison nightmare for South Africa.

At the World Coal Association International Coal & Climate Summit Warsaw, 18 November 2013, Christiana Figueres, Executive Secretary United Nations Framework Convention on Climate Change in her Keynote Address put forward a transition plan for coal with some of the fundamental parameters of this transition:

- Close all existing subcritical plants;
- Implement safe carbon capture and use on all new plants, even the most efficient; and
• Leave most existing reserves in the ground.

At Cop17 it was identified that if nothing is done about climate change and we continue, among other things, to burn fossil fuels and chop down our forests at current rates, the following is predicted for South Africa: and a list is provided, of which the following are of direct relevance here:

• There will be significant changes in rainfall patterns and this, coupled with increased evaporation, will result in significant changes in respect of water availability, e.g. the western side of the country is likely to experience significant reductions in the flow of streams in the region;
• Our biodiversity will be severely impacted, especially the grasslands, fynbos and succulent Karoo where a high level of extinction is predicted;
• Small scale and homestead farmers in dry lands are most vulnerable to climate change and although intensive irrigated agriculture is better off than these farmers, irrigated lands remain vulnerable to reductions in available water;
• Rangelands are vulnerable to bush encroachment which reduces grazing lands;
• Alien invasive plant species are likely to spread more and have an ever-increasing negative impact on water resources;
• Because of our already poor health profile, South Africans are specifically vulnerable to new or exacerbated health threats resulting from climate change. For example, some effects of climate change may already be occurring due to changes in rainfall (droughts and floods) and temperature extremes and Cholera outbreaks have been associated with extreme weather events, especially in poor, high density settlements;
• There will be an increase in the frequency and severity of extreme weather events. Damage costs due to extreme weather-related events (flooding, fire, storms and drought) have already been conservatively estimated at being roughly 1 billion rand per year between 2000 and 2009.

South Africa is particularly vulnerable to climate change because, among other things:
• A large proportion of our population has low resilience to extreme climate events (poverty; high disease burden; inadequate housing infrastructure and location);
• Large parts of South Africa already have low and variable rainfall;
• A significant proportion of our surface water resources are already fully allocated;
• Agriculture and fisheries are important for food security and local livelihoods. Although the poor are only minor contributors to climate change, they are the most vulnerable and, hence, will be the most impacted. The rest of Africa is possibly even worse off.
5. Proposed mining in the Mabola Protected Environment – specific issues

This section answers the question:
What would be the magnitude, scale, duration and permanence of impacts on biodiversity, water yield and quality, agricultural and tourism potential of the proposed Yzermyn coal mine in the Mabola Protected Environment?

In attempting to answer the above question (above box), information from the EIA assessment process has been reviewed by the team and with their expertise and specific knowledge of the area, concerns have been noted and conclusions drawn.

Physical Footprint of the Proposed Yzermyn
The mine drift surface works is depicted in the reviewed documents as occupying some 16Ha on a north facing moderate slope. This includes run of mine product stockpiles and the associated pollution control dams. The proposed discard dump and associated pollution control dams occupies a footprint of some 29Ha, again on a north facing moderate slope. Connecting roadways will be approximately 2km between the mine head and the discard dump and 11km to the exiting R543 route near Dirkiedorp.

Loss of habitat
There will be loss of habitat within particular vegetation types and listed ecosystems, including potential loss of Red Data species, particularly during the construction period.

- The vegetation within the general vicinity is representative of Paulpietersburg Moist Grassland, which is classified as Vulnerable and is considered poorly protected; although it is severely overgrazed in parts it would still have the potential to be restored to high value grassland.
- The area to be undermined is classified as Critical Biodiversity Area – Irreplaceable in the MBSP in the 2013 assessment (note: the Mabola PE was added to the MBSP as a protected area in 2014). Current surface infrastructure layout does not overlap with this CBA, but if the mine plan changed (eg. open-cast area) then it would have a significant impact; one uncertainty of the undermined area is the impact the draw-down cone will have on moisture dependent plant species, potentially changing the species composition of the CBA. This dewatering could dry out wetlands, and thus loss of wetland function as well as exposing these areas to veld fires which can get into the dry prat and organic layers.
- The proposed mine is situated within a listed threatened ecosystem, Wakkerstroom Luneberg Grasslands, which is classified as Endangered.
• While no threatened plant species were confirmed in the vicinity of the proposed mine footprint by the Yzermyn EIA consultants (NSS), they did confirm one Near Threatened and three Declining plant species. Colonies of these species would be at risk if the mine construction were to commence.
• However, the proposed underground mine layout and reduced surface infrastructure would have a much lower impact than if it were an open cast mine.
• There will always be the concern that this could change to an opencast mine once an ROD has been issued, if the economics so dictated.

Under the current infrastructure layout, the scale of this impact is site-specific, the magnitude is moderate, and duration of the impact is permanent. If this were to be an open-cast mine, the magnitude would change to high or very high.

2. Disturbance of populations of threatened and near threatened fauna during the construction and operational phases.

• Includes one Endangered and four Near Threatened bat species that roost in old mine adits just north of the proposed mine – these species have limited cave roosts in the grassland biome, so old mine adits and shafts are valuable habitat; any disturbance would be significant.
• Resident breeding populations of two Vulnerable bird species have been confirmed within the vicinity of the proposed surface infrastructure, namely African Grass Owl and White-bellied Korhaan. These species are unlikely to continue breeding in the vicinity of the proposed mine if construction were to commence. A small breeding population of the Near Threatened Black-bellied Bustard is also present near the proposed mine and would be significantly disturbed.
• Two other Vulnerable bird species have been recording foraging in grassland in the vicinity of the proposed mine, namely Secretary bird and Southern Bald Ibis; these are unlikely to continue utilizing the grassland habitat in the immediate vicinity during construction and possibly during operational phase as well.

Under the current infrastructure layout, the scale of this impact is local (i.e. beyond the boundaries of the infrastructure footprint), the magnitude is high to very high, the frequency of the impact would be intermittent and duration would be long-term.

Hydrological consequences of Yzermyn development:
The proposed mining options include the destruction of seepage zones feeding valley bottom wetlands. These impacts are integrated with the destruction of the soil profile and the interruption of depositional processes within wetlands and downstream thereof.

The projected mine area is 18km², with a potential effect on the hydrology of an area of 33km², feeding three major wetland systems, which will have reduced sustained low flows. This is about 11% of the local wetland areas feeding Heyshope dam (Figure 6). The proposed mining surface works and discard dump will induce the destruction of seepage zones feeding valley bottom wetlands. The direct effect on hillslope seeps may be confined to a quarter of the major area, but groundwater in the whole area will be affected. This is discussed further below, dealing with returns and treated water releases.
Hydrology
Mining inevitably changes the geohydrology of the area, including the relationship between surface and groundwater. Due to the groundwater information not being available, assumptions have to be made in terms of these impacts. Infrastructure required for mining, such as roads and drainage trenches lead to changes in storm water, surface and sub-surface flow which could initiate changes in functionality of the wetlands. Apart from impediment of flow, destruction and fragmentation of natural habitats with the construction of roads, dust, erosion, sedimentation and alien plant invasion are exacerbated along the road servitudes.

The roads systems in the area will be improved, for heavy traffic, but the routes are unlikely to be significantly altered, with the exception of the addition of direct haul road from the mine surface works to the designated discard dump area. The existing roads to the designated discard dump area from the mine and from the mine to the R543 would be upgraded considerably, to cater for the heavy ore trucks. Construction or upgrading will require considerable amounts of water – presumably from boreholes – for dust control and soil conditioning for compaction.
Water Quality
Water quality of both surface run-off and seep contribution to wetland flows will be adversely affected, as will groundwater that may be feeding seeps or valley bottom wetlands at lower altitudes. Clean water interceptor drains will carry higher silt loads than sheet surface flow and run-off from rainfall will be immediate, leading to higher erosion potential in streams.

Dirty water drains and containment dams (pollution control dams) are required to be the first construction scheduled, after access roads. Dirty water run-off from works areas will be collected for use on roads for dust control or evaporated off from the control dams. Either way, this is natural run-off that is lost from the wetlands systems, although the area is small (0.4km²).

Biodiversity
The proposed construction of the works area and discard dump have minor incursions into delineated wetlands areas, so the destruction of wetland ecosystem habitat is expected to be minimal. Whether or not this could be achieved is anybody’s guess, but wetland edge disturbances and drainage pattern changes will take place around the contained surface works. If the mining is downgraded to open cast mining, the impacts will be huge.

Area Characteristics
The area is characterised by undeveloped grasslands which are in good condition and generally of excellent scenic quality and cultural heritage (figures 7 to 14).

Consequences of Road Development
Upgrading of access roads, capable of accommodating 40ton to 60ton ore carriers, for coal export, would be necessary – and extensive and expensive. The likelihood of major erosion initiation is low to moderate, as this route has been in existence for quite some time.

Invasives – including people.
While there would be limited job opportunities for the unemployed in Dirkiesdorp, there would also be an inevitable influx of job seekers and camp followers, which could put a strain on the resources of the town and village, existing infrastructure and municipal services. On the socioeconomic side, such an influx can be disruptive to families.

The influx of work seekers and worker service personnel (food and sex) is likely, but the impact could be very dependent on the decisions made by mine management. It should be an imposed condition on development that housing of mine workers and staff should be off site, in already established towns. This diminishes local degradation and also provides a potential for increased revenue income for the town management and development.

Tourism
The tourist attractions are the wide vista of seemingly unaltered steep sloped valleys, with abundant bird life – suitable for a range of hiking, birding and photographic activities. Mine dumps and head
works would alter this near idyllic scene and the continuous stream of heavy trucks would detract from the tourism, existing and potential.

**Habitat Fragmentation**

Habitat fragmentation should be restricted to the effects of the road haulage – essentially from the discard dump to Dirkiesdorp.

![Image of area near Proposed Yzermyn, looking north.](image1)

**Figure 7: Area near Proposed Yzermyn, looking north.**

![Image of area around existing mine on Portion 4 of Loskop 105 HT, looking north west.](image2)

**Figure 8: Area around existing mine on Portion 4 of Loskop 105 HT, looking north west.**
Figure 9: Typical Topography - Central Area with outcropping shales with interbedded coal (centre of photo). Looking NNW.

Figure 10: Area in central zone of Mabola Protected Environment, looking North

Figure 11: Yzermyn Works site on the left ridge – looking south.
Figure 12: Yzermyn Discard Dump site in foreground – looking north.

Figure 13: Fragility of steep sloped roadways

Figure 14: “Excellent” road
Hydrological Function

As stated above, the Mabola conservation complex lies on the cusp of three major catchments, with the majority (including the existing old coal mine on Portion 4 of Loskop 105 HT) lying in the Assegai River and Heyshope Dam greater catchment. The other two are the Buffels and Phongola rivers.

Of particular concern, should mining take place, are the Assegai and Mawandlane rivers upper reaches, which would receive any polluted discharge from the proposed Yzermyn mine and would be affected by changes in groundwater discharge through wetlands. Water quality and quantity are both critical, particularly as Heyshope dam is used for inter-basin transfers, the majority of which is for Eskom power stations and is required to be high quality.

This emphasises the criticality of preserving the wetlands in the area and rehabilitating those that may have been degraded by past farming or mining / quarrying practices. The Stewardship Programme and input of funds and expertise by WWF and SANBI have been further empowered by the proclamation, which removed the uncertainties induced by the possibilities of degradation of the area by further mining development.

Figure 15: Wetlands, Rivers and Existing Infrastructure
Heyshope to Grootdraai Transfer Scheme

Eskom requires good-quality water to operate their coal-fired power stations near Witbank and they import clean water from the eastern escarpment (inter alia Heyshope dam) rather than carrying the costs associated with the purification of poor quality (low pH) Witbank Dam water.

Proposed Mine Footprint and Works

The indicated mine footprint is limited to surface works for access to underground bord and pillar mining, with a discard dump and associated pollution control dams. This is indicated in figure 16 below, with the following two figures (Figures 17 & 18) detailing the surface works and discard dump separately. Both sites infringe on seep wetlands and wetland buffer zones. This has a definite but limited impact on the adjacent wetlands, particularly on fauna and flora through noise, dust and general habitat degradation.

Proper management of well-designed clean water drainage - collecting sheet run-off from upslope of the mine works and discharging to the wetlands direct – and dirty water drains discharging to pollution control dams, should result in only minor impact on the wetlands. Apart from occupying some of the designated wetland areas, there would be a loss of sheet run-off inflow to the wetlands, partly replaced by concentrated inflows from clean water drainage systems.

Polluted – or dirty - water is typically used for watering the roads to cut down dust generation. Whether or not this creates a secondary pollution source has not been researched, but it is most probable that it does, with run-off from normal rainfall then carrying mine pollutants. A high proportion of the dirty water is lost by evaporation and residual solids have to be removed from the dams and should be exported to hazardous waste disposal sites.

With a mine life of 15 years, the risk of wetland pollution or damage through poor mine management is reasonably low, especially if high penalties may be imposed by DEA. However, the major risk is post mine operations, with little supervision of the environmental issues, potential acid water decant and no funding to put management systems in place.
Figure 16: Proposed Mine and Discard Dump in Wetland Areas

Figure 17: Proposed Mine Surface Infrastructure
Mine Water and Pollution Control

Quantum of Mine Inflow an Impact on Catchment Yield

The probable influx of groundwater to the underground works has been modelled, based on limited information, and it is therefore possible to have significant variations from the model in practice. Suggested inflows are probably optimistic at about 400m$^3$/day and higher flows up to 1200m$^3$/day may be encountered, depending on detailed geological occurrences, such as dykes and sills. This will influence groundwater levels in the area.

During mining operations, there will be a significant use of water for dust control on gravel haul roads, which will be the 11km road from Yzermyn to the tarred road at Dirkiesdorp and 2km between the mine works and the discard dump. These will require a net water application of between 1200m$^3$/day and 2000m$^3$/day, for the 15 year life of the mine. Additional “water use” would be the dirty water collected from the operational works area and discard dump, to be lost by evaporation in pollution control dams, amounting to a further 500m$^3$/day.

The probable loss of catchment yield could be as high as 0.9 $10^6$m$^3$/a, which is 1% of the Mean Annual Run-off of the W51A catchment of 87.6 $10^6$m$^3$/a. This may seem trivial, but in a water stressed country, water “generation” is critical and a multiplicity of mines – let alone other water reduction activities – would see the catchment lose 10% of its run-off.

There will have to be adequate provision of major evaporation / pollution control dams (PCD) or of a water treatment works, although the apparent water balance implies the need for additional water supply from boreholes.
The issue to be resolved is that of post mining operations. Once mining has ceased, it is estimated that the time to fill the mine voids with inflow will be about 45 years\textsuperscript{22}. There is then the probability of acid mine decant which must be dealt with, either by evaporation or by treatment of decant and disposal of residuals. Disposal of treated water could be by selling to a municipality for human consumption, which may be limited, or into the river system. Decant treatment therefore has to be to high quality standards and provided for in perpetuity – difficult, when there is an interim dormant period of 45 years and the beneficiaries of the mine are long gone and any financial provision has been lost to inflation.

**The management of the depleted mine must be to treat and utilise the water as a continuous operation.**

**Potential for Acid Mine Decant and Pollution**

Acid rock drainage is a process whereby contaminants (especially metals and sulphate) are released from solid to liquid phase under acidic pH conditions due to the oxidation of sulphide minerals in the presence of oxygen (or other oxidants like ferric iron or manganese) and water, potentially accelerated by bacteria\textsuperscript{22}. Modeling of probable potential acid generation (PAG) is based on laboratory testing and is also not exact.

Seepage from several mine residue deposits associated with the proposed development has the potential to impact on the ambient groundwater quantity and/or quality. The majority (67\%) of the Yzermyn coal samples are classified as potentially acid generating. While one discard samples is classified as potentially acid generating, the other sample is considered inconclusive.

Following the precautionary principle and considering that various coal and discard qualities might be stockpiled or deposited simultaneously, all stockpiled coal and discard material should be treated as potentially acid generating with an expected acidic leachate quality \textsuperscript{22}. While the pollution control dams will be required to be lined, the discard dump may have an impervious footprint membrane, but is more likely to be founded on a compacted clay base, which is still slightly pervious. The discard dump is likely to be uncovered (uncapped) for the life of the mine, but may be capped at closure of the mine, thereby reducing the potential for acid drainage water. The likelihood of a pollution plume from the discard dump must be considered as real, as depicted in Figure 19 below.
Future Development

Coal mining is limited within the municipal area and Savmore Coal Mine on the eastern extent of the municipal area was identified as the only operational mine. There are also small defunct coal mining operations outside the study area near its eastern border, as well as to the north in the Ermelo district according the report from SRK. The beds of the Vryheid Formation outcrop over the eastern portion of the municipal area provide some potential for open-cast coal mining. However, the highly weathered seams are not generally amenable to good coal recovery and activities are likely to be restricted to small-scale recovery by entrepreneurs using low-cost mining methods. Their marginal nature would present a challenge to compliance with environmental management programmes and financial provision for rehabilitation.  

The potential for extended coal mining in the Mabola and adjacent conservancies is high (Figure 20) and control of prospecting licenses, which imply that mining licenses will be granted, is limited. Centre for Environmental Rights director Melissa Fourie says Minister Shabangu is caught in a legislative snare: the Mineral & Petroleum Resources Development Act gives neither her nor her department the discretion to refuse to accept a mining application as long as the applicant fills in the form and pays the R500 fee and no-one else holds the mining right.
Future development in the Mining Right Area is not discussed in the documentation available, but there is a very high probability that there are other developments intended, which may be either open-cast or underground workings. Although there is no stated intention to open-cast mine the currently proposed area, the possibility of expansion to open-cast mining can never be ruled out once mining has commenced or the underground workings are depleted. (Thin end of the wedge syndrome). This is most dependent on the levels and parting of workable coal seams, of which only two are to be exploited in the current proposal.

Externalization of environmental costs:
The environmental costs of coal mining are generally externalized, the environmental costs of coal mining are not only the loss of biodiversity, ecosystem services, and pristine scenery but there are greater further reaching and more devastating costs.

The use of coal for power generation and heating is one recognised cause of Climate Change, the consequences of which are being felt throughout the world and, particularly by the poor. Climate Change results in more extreme weather patterns such as larger more violent storms, causing flooding, loss of lives, houses, crops, damage to roads and other infrastructure. Climate change also causes droughts and high temperatures resulting in loss of livestock and crops and large run-away fires (e.g. recent Cape fires and those in South East Australia). Water resources, such as dams, which stored and released regression flows, are inadequate to store large volume floods, making the need to preserve wetlands even more critical. The financial consequences of Climate Change for South Africa can be calculated by the costs to repair infrastructure after storms, provide flood or drought relief, loss of income in the agricultural sector, cost of food importation and fighting large fires. The more long term costs of rising sea levels on coastal cities are yet to be felt, but the damage to coastal infrastructure due to high sea surges are already being felt. These high intensity storms also cause accelerated erosion and top-soil loss, with accelerated dam siltation, and significantly reduce the
regression flows in in rivers. These regression flows are vital for dry period water supplies, with or without storage dams.

Additionally the burning of coal is a major cause of respiratory diseases. This is evident in the high incident of these diseases within people living on the highveld, again this predominately affects the poor who can't afford to move away from the pollution.

Acid mine drainage is a long-term cost of coal mining that continues often long after the closure of the mine. The expense of cleaning the water is left to the local municipalities or government long after the profit has been made by the mine and the shareholders have moved on.

A recent Case Study on the Social and Environmental Consequences of Coal Mining in South Africa identified amongst other findings the following:

- That ex-mine workers recurrently suffer from silicosis, other lung diseases, and hearing loss. These medical costs are being shifted from the mines onto the state and constitute a subsidy to the mines and their profitability.
- That constant blasting affects children, makes local children nervous, listless and not keen to learn.

It is reported that there are approximately 6000 abandoned mines in South Africa (not all coal mines), and the costs of rehabilitation (soil- and land-wise) has been estimated at 100 billion Rand (which in 2008 amounted to US$ 14 billion). It is further reported that if the externalities of only the climate change cost from CO2 and Methane from the coal economy were to be internalised the price of coal would more than double. It is also mentioned that no closure certificates have been granted in the past 8 years, which gives a clear indication that the government has an understanding of the scale of the liability of future pollution and related costs from closed coal mines.

It is argued that the costs of closure that would properly mitigate the damage done by mining, and the future damage that can be reasonably expected, may well outstrip the profits that the coal companies are making. This represent robbing of future generations.

6. Conclusions

Based on the review of the available documentation the following conclusions may be reached.

1. Mining in a Protected Environment can only take place with the Minister’s written consent – and such consent is likely to be based on existing departmental policies and strategies.

2. The Mabola Protected Environment was correctly and reasonably founded and as such is a valuable component of the Mpumalanga Protected Area network.
3. The deproclamation of the Mabola Protected Environment would not be consistent with the findings that the initial proclamation was sound and justified. Deproclamation to enable mining would be subject to intense scrutiny and challenge. It may have a lasting negative consequence on both social and legal aspects of stewardships, protected area expansion interventions and private protected areas.

4. The proposed Yzermyn has been the subject of sound and extensive studies with reasonable mitigation measures proposed, particularly over the short term. There, however, remain unknowns (financial, social and environmental) which may alter the environmental impact, particularly if worse case scenarios arise, or unforeseen events occur. This will be particularly significant over the longer term.

5. It is theoretically possible for the Yzermyn mine to operate without significant impacts to the whole area if all mitigation measures are implemented and best practice mining is undertaken. There is, however, likely to be post mining decanting which will have a detrimental impact on the area if not managed, and may well encumber future generations with pollution control problems. The availability of sufficient set aside funding for treatment for the foreseeable future (50 plus years) seems unlikely. The treatment of the post mine area and decant may very well end up as a never ending task.

6. If one mine is allowed to operate in the Protected Environment, the Minister may be under significant pressure from the tide of other mines wishing the same favour (in this and other Protected Environments). This could very rapidly escalate the cumulative impacts of these mines and rapidly destroy the biodiversity value and ecological infrastructure resource.

7. Improved understanding of the trade-off between biodiversity conservation and mining can only be gained through detailed resource economic studies, on an extended time frame – 50 years plus.

8. The area is an important climate change focal area, with important and necessary wetlands. The loss of these will negatively affect local communities as well as further removed downstream communities and established users outside the catchment (inter alia Eskom who demand high quality water for power generation).
7. Recommendations

1. The deproclamation of a protected environment is not a viable option and, if attempted, would be exposed to serious risks and would also expose all protected environments.

2. Mining in the Mabola Protected Environment is not recommended due to its sensitivity. The minister is therefore cautioned against approving mining in this Protected Environment.

3. Given the sensitivity and strategic importance of the Mabola Protected Environment, a strong precautionary approach is recommended to prevent damage from occurring that cannot be mitigated.

4. Should the Minister choose to allow mining in the protected environment, this must be done with stringent conditions that will ensure best practice mining at all times, excellent monitoring, independent oversight and ministerial adjudication (both DMR and DEA) for any mine plan changes (such as MPDRA section 102 applications).

5. Should Atha Africa Ventures wish to still pursue mining within Mabola Protected Environment despite associated sensitivities, it is recommended that a detailed independent peer review of all environmental assessments is undertaken to accurately quantify the costs of mitigation for both operational and post closure phases of the proposed mine (the current mitigation for both operational and post closure phases seems inadequate and hence the need for a more accurate assessment).

6. The detailed independent review should include resource economic evaluation over the long term (at least 50 years). The evaluation and mitigation of long term impacts has to be carried out with proper valuation of the environmental goods and services over this long term period and not only considered for the life of the mine and partial rehabilitation.

7. Pending the outcome of such a review, it is theoretically possible for the Yzermyn mine to operate without significant impacts to the whole area if all mitigation measures are implemented and best practice mining is undertaken.

8. The management of water ingress to the depleted mine must be to treat and utilise the water as a continuous operation from closure – not waiting for the mine to fill before decant water treatment is initiated.
8. References

5. Mpumalanga Protected Area Expansion Strategy (2009). Edited by: Brian Morris and Brent Corcoran, WWF-SA
8. “Coal and Water Futures in South Africa: A case for conserving Headwaters in the Enkangala Grasslands”; WWF; Nov. 2011
15. RAMSAR. http://www.ramsar.org/about-the-ramsar-convention
18. Dr Pixley ka isaka Seme LM – Spatial Development Framework (November 2010) – Potential Mining – Figure 19.

Home Page > Resource Management > Water Infrastructure > Bulk Transfer Schemes


26. DEA, (DEPARTMENT OF ENVIRONMENTAL AFFAIRS), DMR (DEPARTMENT OF MINERAL RESOURCES), CoM (CHAMBER OF MINES), SAMBF (SOUTH AFRICAN MINING & BIODIVERSITY FORUM) & SANBI (SOUTH AFRICAN NATIONAL BIODIVERSITY INSTITUTE) 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.