Planning for a sustainable relationship between mining & the environment in the Limpopo River Valley

October 2012
Narrative

1. Natural Context
2. Social Context
3. Ecosystem Services
4. Coal Exploration
5. Sustainable Development
1. Natural Context

• Soutpansberg mountain range
  – +- 150km long
  – Derives name from large salt-pans
    • *Found at the base of NW slopes*

• E-W orientated creating micro climates
  – Wetter rainfall catching slopes to the South
    • *Warm moisture-laden winds from Mozambique*
    • *Rise up steep southerly slopes*
    • *Condenses to form mist, often turns to rain*
  – Dry plains
    • *Rain shadow to the north*
2. Social Context

• Past inhabitants
  – Early, Middle to Late Stone Age sites
  – Early Iron Age sites
    • Engraving & rock art co-occurring
  – Traditional home’ of many Venda tribes
    • Vhenda ruins

• Current
  – Vhembe District Municipality
    • 1,2 million inhabitants
2. Social Context

• Gathered in & around mountain island
  – Numerous settlements
  – Where communities make use of ecosystem services
  – Supplied by the Soutpansberg
3. Ecosystem Services

• Biodiversity refers to:
  – Full range of living organisms
    *(Terrestrial, aquatic, marine)*
  – Ecological complexes of which they are a part

• Rich biodiversity
  – Underpins diverse ecosystems
  – Deliver ecosystem services
  – That are of benefit to people

*Millennium Ecosystems Assessment 2000*
3. Ecosystem Services

**Provisioning**
- Food
- Freshwater
- Mineral Value

**Regulating**
- Climate
- Groundwater
- Water Purification

**Supporting**
- Biomass
- Biodiversity

**Cultural**
- Scenic Value
- Conservation
- Heritage
3. Ecosystem Services

**PROVISIONING**

- Products provided by ecosystems
  - Food Production (*Cultivation for human consumption*)
  - Fresh Water (*Low salt concentration*)
  - Energy & Minerals (*Non-renewable provisioning*)
3. Ecosystem Services

**REGULATING**

- Benefits from the regulation of processes
  - Climate \((CO^2\ capture)\)
  - Ground Water \((Longer\ term\ availability)\)
  - Water Regulation \((Purification\ &\ flood\ mitigation)\)
  - Soil Retention \((Prevention\ of\ erosion)\)
3. Ecosystem Services

**Supporting**

- Necessary for production of all others
  - Biomass (*Production of organic compounds*)
  - Biodiversity (*Richness of life*)
  - Habitat (*Providing a niche for survival*)
3. Ecosystem Services

**CULTURAL**

- Shared attitudes, values & practices
  - Scenic Value (*Natural scenery*)
  - Preservation (*Protection of wildlife, flora & habitats*)
  - Human Impacts (*Levels of transformation*)
  - Heritage Value (*Artefacts from past generations*)
3. Ecosystem Services

- ESS not well understood
- Few conservation areas exist
  - To protect the value of Nature
- New approach
  - Places a emphasis on societal benefits
    - Provided by nature
    - Especially those related to life support processes
  - In this case
    - People living in the valleys of the Soutpansberg
4. Coal Exploration

• Successive faulting 2 700 mya
  – Seismic action of Limpopo mobile belt
Quartzite rocks deposited 1 800 mya
  – Sandstone & bands of conglomerate
  – Underwent intense metamorphism
Recent block-faulting 150 mya
  Strata dipping to the North
  – Rise to the South (cliff lines)
Vhembe
Biosphere Reserve
Ecosystem Value Analyses

PROVISIONING
MINERALS:
DOMINANT
FORMATIONS

Supergroups
- Blouberg
- Soutpansberg
- Lebombo
- Karoo

Groups
- Waterberg
- Bandelierkop
- Houtriver
- Schiel

Complexes
- Beitbridge
- Bulai

Formations
- Kromdraai
- Malvernia
- Goudplaats

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Drafted by: Traverso & Associates

Project Title:
Plan Title:

PROVISIONING
REGULATING
SUPPORTING
CULTURAL
4. Coal Exploration

- Same geologic forces
  - Responsible for creation of Soutpansberg
  - Formed number of coal bearing seams

- Potential to support mines
  - Which will have an impact on ESS provided by Soutpansberg
  - Especially water & biodiversity.

- However, when location of coal bearing seams
  - Compared with areas of high ESS value
  - It is evident that they do not coincide
4. Coal Exploration

- **Vele Colliery**
  - Operational, 30y life span
  - Extreme caution
  - Not to affect Mapungubwe WHS

- **Makhado Coal Project**
  - Planning stage
  - Stakeholder engagement
  - Prospecting
  - Ecosystem Services impact assessment
# 6. WHS: Review & analyses

## RISK ANALYSIS OF 21 WHS

<table>
<thead>
<tr>
<th>Country</th>
<th>WH Site:</th>
<th>Eia Value</th>
<th>OUV Value</th>
<th>Evaluation</th>
<th>State*</th>
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*State*

| 01-12 = STABLE | 13-24 = AT RISK | 25-26 = HIGH RISK | 37-28 = CRISIS |
5. Sustainable Development

• Pattern of economic development
  – In which resource use
    • Aims to meet human needs
    • While preserving the environment
  – So that these needs can be met
    • Not only in the present
    • But also for generations to come
  – Ties together concerns
    • For the carrying capacity of natural systems
    • With the social challenges faced by humanity
5. Sustainable Development

• Land Use dependant on Natural Services
  – Upstream sources
  – Healthy processes
  – Mitigation of impacts
  – Avoid negative effects on other land uses
  – Holistic planning required
5. Sustainable Development

• Integrated planning
  – Dept of Economic Development, Environment & Tourism
  – Vhembe Biosphere Reserve
  – University of Venda
  – Proposed Mining Forum

• Biosphere Zonation
  – Biodiversity mapping
  – Core, Buffer & Transitional Zones

• Mine closure strategies
5. Sustainable Development

• Possibility of high biodiversity & ESS services
  – Existing in relative harmony
  – With high value coal seams is possible

• High value ESS factories
  – With associated corridors
  – Linking Soutpansberg to Limpopo River
  – Through correct planning
    • Environmental Management Framework
  – Solution in managing conflicts can be found

• Concept of “No Go” & “Go” areas
  – Could result in support for conservation by Mining groups
  – Improve time frame for decisions on mining rights
5. Sustainable Development

- Potential projects & programmes
  - Nzehelele catchment (Zero impact)
    - Improving catchment health & management
    - Removing alien plants
    - Improving current irrigation infrastructure
  - Bat populations & macadamia plantation
    - Prove service to farmers
    - Pest control
5. Sustainable Development

• COAL of Africa approach
  – Aims to create long-term value
    • For the broadest group of stakeholders
  – Emphasis on environmental, social & governance issues
    • Strive to ensure minimal adverse impact on
    • Surrounding environment & communities
    • Active stewardship of land & biodiversity
  – Social & economic developments
    • Foster enduring legacy for all stakeholders

• SD Toolkits