

SECTION 1: THE NATURAL ENVIRONMENT

1.4 THEME: GEOMORPHOLOGY

OVERVIEW

The topography of the MCLM rises in the east from 1220 m.a.s.l. and peaks in the Magaliesburg range (1840 m.a.s.l.) in the west. The Magaliesburg range is the headwaters for the Crocodile River, which ultimately drains into the Limpopo drainage system. The undulating topography yields many microhabitats owing to numerous micro-climates.

WHAT ARE THE PRESSURES?

- Land use planning has not taken into account erosion and/or stability risks associated with the soils in MCLM.
- Unsustainable agricultural practices.
- Development of ridges.
- Unsightly development in highly visible areas.
- There is a high risk of sinkhole formation due to:
 - The inherent instability of the subsurface;
 - Fluctuations in the water table due to ground water usage;
 - Water pollutants dissolving the dolomites and causing sinkhole formation; and
- Seismological events in geological faults and dykes.



Sinkhole, part of a series, at the Rietspruit River, Sept 1996

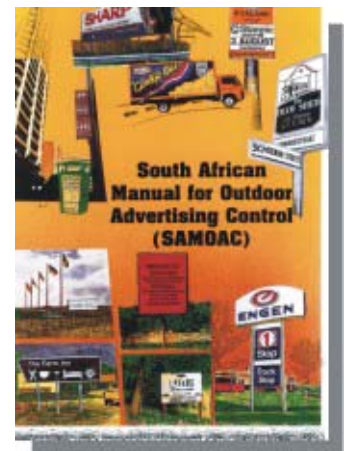
WHAT IS THE STATE?

- The variable topography of the MCLM results in diverse Visual Absorption Capacities providing ubiquitous visual relief to citizens and visitors.
- MCLM is underlain by six geological units within the Pretoria Group (also refer to Map 13):
 1. Magaliesburg formation Recrystallised orthoquartzite
 2. Silverton formation Siltstones, shales interbedded limestone and hornfels
 3. Daspoort formation Orthoquartzite and shale partings
 4. Strubenkop formation Ferruginised shale and quartzite
 5. Hekpoort Formation Andesitic lava
 6. Timeball Formation Shale, siltstone, slate

- Soil structures are varied and 46 different land types occur within MCLM (also refer to Map14)
- 33 724 ha of land (31% of Mogale's total land) is highly unsuitable for infrastructural development and 1,3 ha (4%) of this has already been developed.
- Dolomitic conditions are prevalent mainly in the central area, with 15% of undeveloped land underlain by unstable soils.
- 3636 ha (3,3% of the Mogale area) of development (including agriculture) in MCLM has occurred on highly erodable soils.
- 6109 ha of land (5,6% of Mogale's total land) within MCLM is classified as having a Very High or High erosion hazard potential.
- The gold and uranium mining activities of the past have resulted in some soils becoming contaminated and radioactive.
- Other major pollution sources affecting the soils in MCLM include:
 - Slimes and tailings dams;
 - Existing mines and mining waste dumps;
 - A landfill site lies northeast of Luipaardsvlei Estate, between the railway line and Wentworth park residential area;
 - Extensive fertiliser and pesticide usage in the agricultural sector; and
 - Unmanaged industrial effluent.

WHAT IS THE RESPONSE?

- The MCLM Disaster Management Plan (2002) highlights the following needs:
 - A Dolomitic risk assessment;
 - Strict control on development underlain by dolomites;
 - Electromagnetic surveys for dykes and faults;
 - Mapping and Monitoring Programmes developed by Geophysicists;
 - Waste Management Reporting systems;
 - Polluting Monitoring Programmes; and
 - Enforcement of water quality guidelines and drafting of by-laws.
- GDACEL – Environmental and Land Affairs Information layers and buffer zones for industries, sewage treatment works, landfill sites and mine dumps. Gauteng (2002).
- GDACEL - Gauteng Agricultural Potential Atlas (2002).
- GDACEL – Development Guidelines for Ridges (2001).
- United Nations Convention to Combat Desertification (UNCCD) (1994).
- South African Manual for Outdoor Advertising Control (SAMOAC) (1998).
- By-laws for the Control of Signs and Advertising Hoardings.



WHAT ARE SOME OF OUR PROPOSED INDICATORS?

1. *Number and location of sinkholes formed and reported annually*
2. *Monitoring of geophysics and waste management*
3. *Monitoring ground water quality*
4. *Adoption and implementation of a policy regarding development on erosive and/or unstable soils*
5. *Adoption and implementation of a policy to control development on ridges*
6. *(%) New development on unstable or erosive soils*
7. *(%) New development on ridges*
8. *Incidents reported in contravention of the advertising by-laws*

WHAT CAN YOU DO?

- Investigate the sub-surface features prior to developing within MCLM.
- Avoid developing on ridges.
- Ensure that the MCLM is made aware of advertising that is in contravention of the local by-laws.
- Create your own compost heap to feed your vegetable garden.

LINKS TO OTHER THEMES

- Housing
- Tourism
- Mining
- Agriculture
- Health
- Open Spaces

