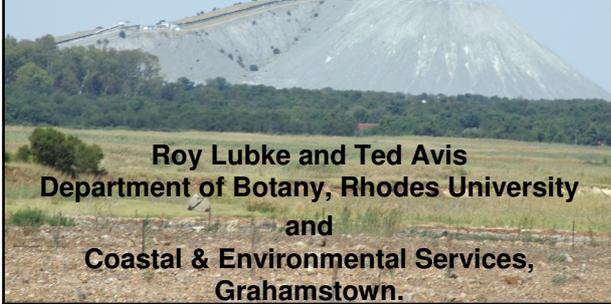


Restoration of Degraded Environments: the Environmental Consultant's perspective



Introduction

- The basic concepts and approach to rehabilitation in SA is wrong. Why?
- No fundamental ideas or concepts are formulated about future land of the degraded land.
- The aim of this presentation is to show how a rehabilitation ecologist can create a useful environment from waste or degraded land.

What I will examine in this presentation:

- What "restoration" has been done in this country and is continued to be done.
- What restoration projects have been carried out in other parts of the world.
- Some of our rehabilitation applications as environmental consultants for EIAs for dune mining.

Some early Restoration Projects in SA

- Mine dumps of the Witwatersrand



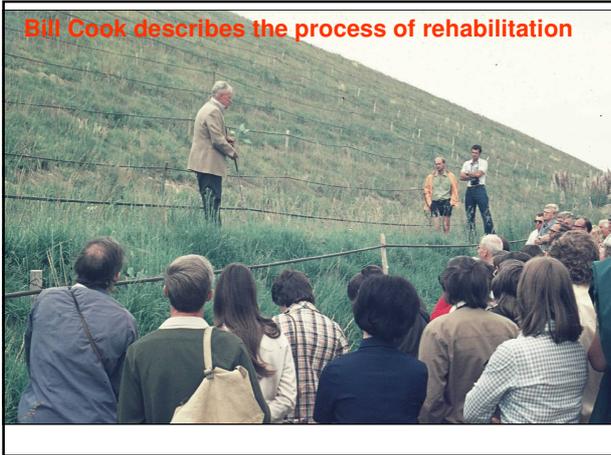
AIR POLLUTION



WATER POLLUTION



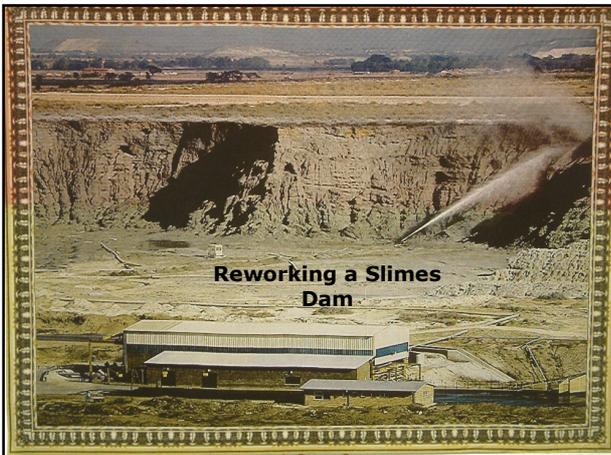
Bill Cook describes the process of rehabilitation



Historical Account of the Vegetation of the Witwatersrand Mine Dumps



Reworking a Slimes Dam



Armouring, topsoiling and establishment of grasslands



Comments on Land use and the Mine stabilisation Programme

Cook(1961) there is potential for land-use:

- Sports grounds
- Light industries
- Timber – *Acacia melanoxylon* – Black wattle.

Comments on Land use and Mine stabilisation Programme

- A British landscape architect was a noted persistent critic: “you can’t afford not to plan the dumps. You have a moral obligation. It should be a matter of pride for them to have a master Plan”. (Lovejoy, 1974).

Bourne and Veres (1974) did a cost-benefit analysis on turning slimes dams into Regional Parks.

Land use of Mine sites

- Benrose and Park Central Industrial sites
- Motorways
- Residential sites in Springs
- Landfill sites

M1 motorway developed in southern Johannesburg on slimes dams

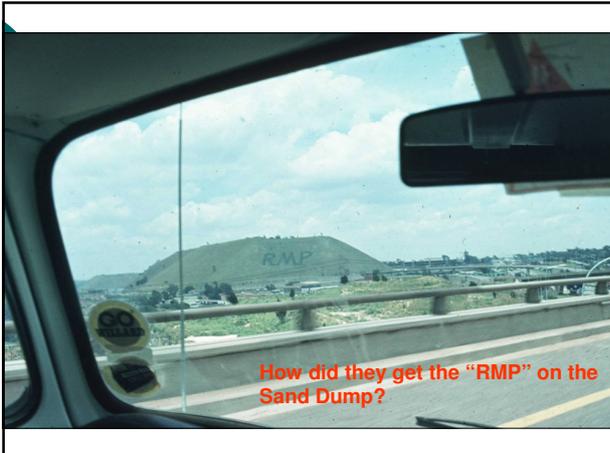


Landfill site - Waste on top of slimes dam



Reasons for the lack of planning of the future land use in SA

- There appears to be plenty of space for all land uses without the need to reclaim land for future use.
- Dunkley (1974) – land on which mine dumps occurs is worth a fortune if developed. Ownership and out-dated laws prevent development.
- Nicol(1977): There is 13% of valuable but derelict land in the CBD of Johannesburg.



Reasons for the lack of planning of the future land use in SA

- Lack of consultation with the local rural communities and an authoritarian approach to land use by the government and local authorities.



Further reasons for the lack of planning of the future land use in SA

- The belief that the restoration of the natural ecosystems is best for our country and conservation of the environment, i.e. the strong **wildlife and conservation ethic among SA authorities.**

Further reasons: objectives of mine closure

- to ensure safety and health of humans and animals,
- to minimise environmental damage or residual impacts, and
- **to rehabilitate land to, as far as is practical, its natural state.**

Applications of Rehabilitation in EIAs (CES, 2004)

Our investigations generally had the following objectives:

- To identify sustainable land use options that are feasible, and that take cognisance of existing constraints.
- To assess and consider community needs, aspirations and capacity when evaluating the land use options.
- To evaluate each of the land use options from a sustainable development perspective (environmental, social, economic and institutional).

Defining sustainable development

1987 World Commission of Environment and Development – the Brundtland Commission:

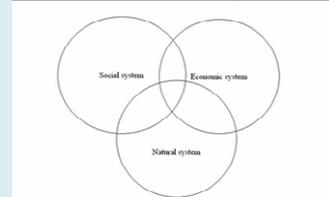
'Development that meets the needs of the present without compromising that of the future generations to meet their own needs'.

Defining sustainable development

The Mining, Minerals and Sustainable Development (MMSD, 2002):

“the interaction between humans and the biosphere involves integrating and meeting social, economic and environmental goals.”

Mebratu's (1998) interactive model of sustainability

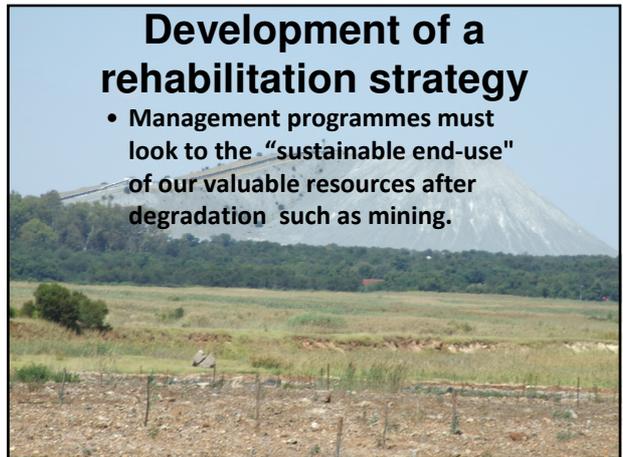


Development of the rehabilitation strategy

- An approach that takes cognisance of the social, economic, natural and government or institutional sustainability.
- Four pillars of sustainability on which restoration principals are founded

Development of a rehabilitation strategy

- Management programmes must look to the “sustainable end-use” of our valuable resources after degradation such as mining.



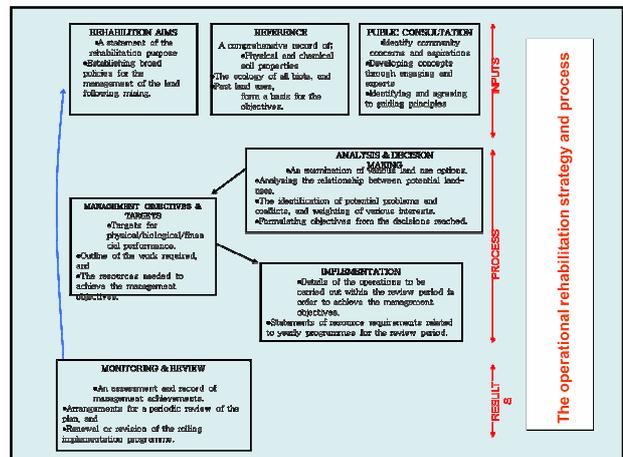
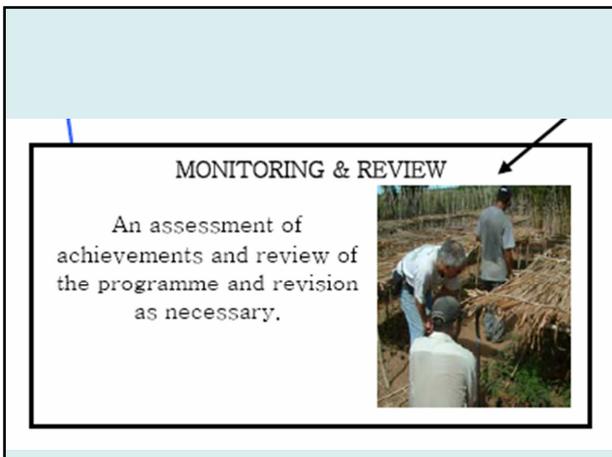
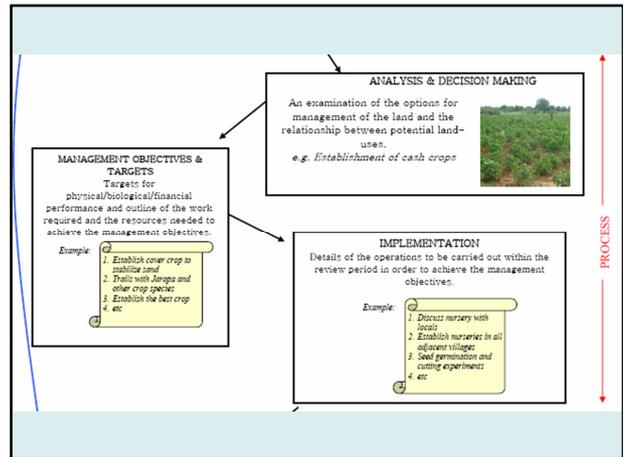
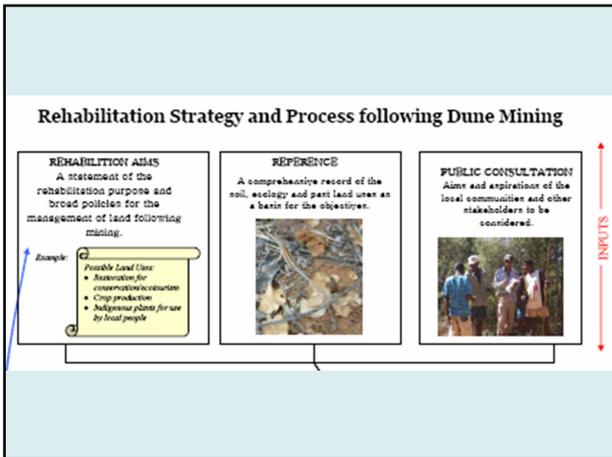
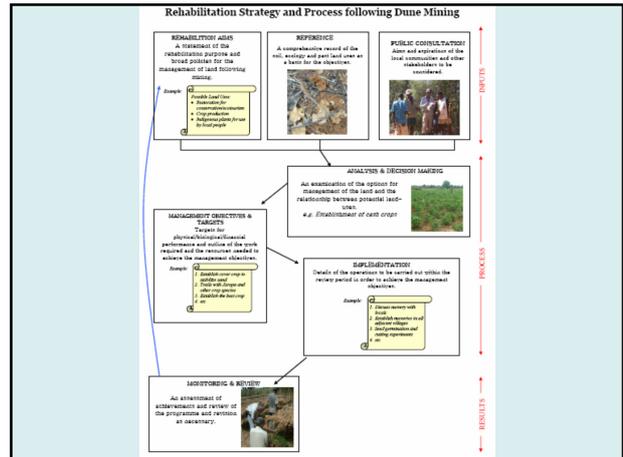
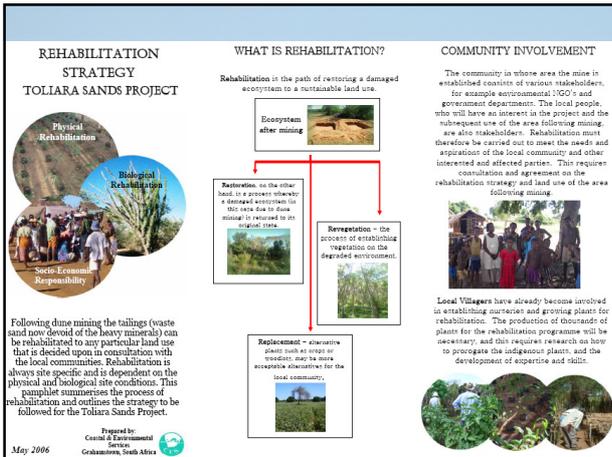
Rehabilitation Strategy Defined

- A **Rehabilitation Strategy or strategic framework** that can be used to:
 - ❖ Establish a management vision and objectives for sustainable land-use after mine closure.
 - ❖ Establish what sort of rehabilitation is required or desired by the local people – the end users (i.e. their land use requirements).
 - ❖ Formulate a rehabilitation plan.

The rehabilitation strategy will lead on to the **rehabilitation and environmental plan** that is to be implemented at the mine site.

REHABILITATION STRATEGY TOLIARA SANDS PROJECT



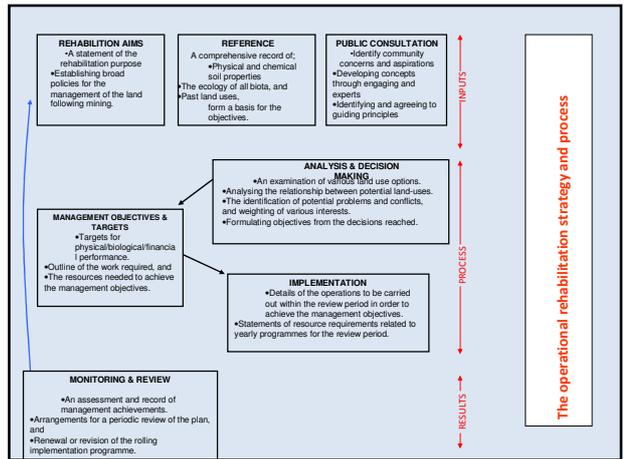


Application of Rehabilitation in Dune Mining in Mozambique



KENMARE REHABILITATION STRATEGY

- KENMARE MOMA TITANIUM MINERALS PROJECT, MOZAMBIQUE

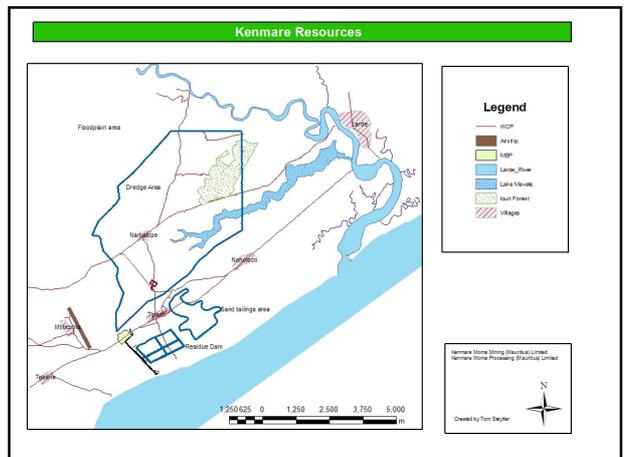


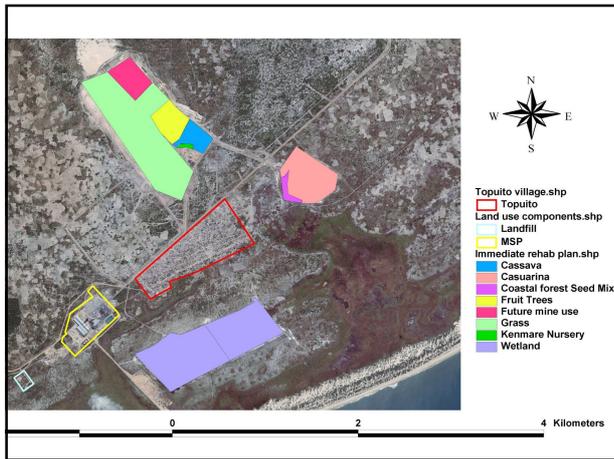
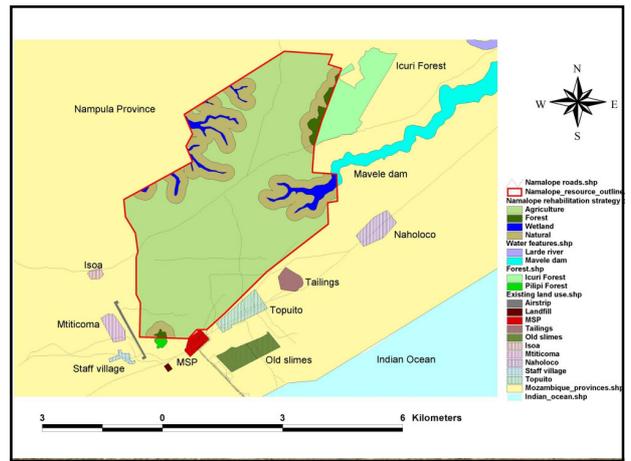
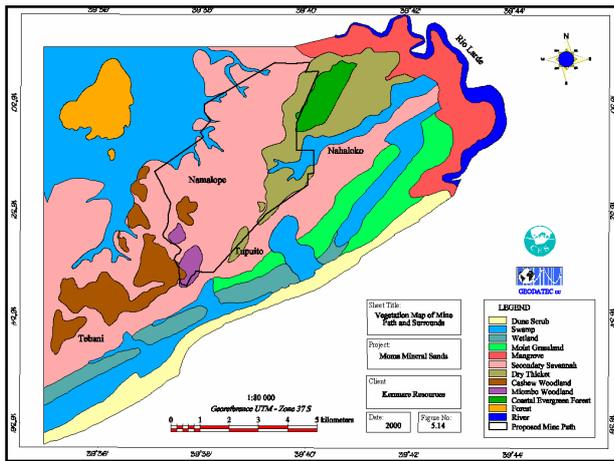
ENVIRONMENTAL MANAGEMENT PLAN

MOMA TITANIUM MINERALS PROJECT
MOZAMBIQUE

Prepared by:
Coastal & Environmental Services
Consultants
South Africa

Tom Dayler
EHS Manager
Kenmare Moma Mining (Mozambique) Limited
(Mozambique Branch/Kenmare Moma
Processing Materials Limited (Mozambique
Branch))









Can we achieve the degree of land-use of rehabilitated land achieved in projects overseas?



Reclamation of a Colliery Tip to form pasture



Reclamation of colliery tailings to "parkland" and establish of industrial sites in Yorkshire



Coal and Clay Mining, Potteries and Central Forest Park



Entrance to Central Forest Park, with a mining theme



Quarry rehabilitation in an urban fringe context: Lafarge St-Constant case study, Quebec, Canada



Des



Aerial view of the St-Constant cement plant

Leisure activities proposed for the phase one area of the quarry

Ecological restoration of a quarry contributes to a proposed urban greenbelt

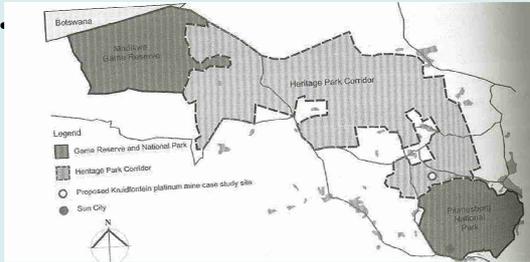
Paper by Sarah Lowe and Ken Zimmerman



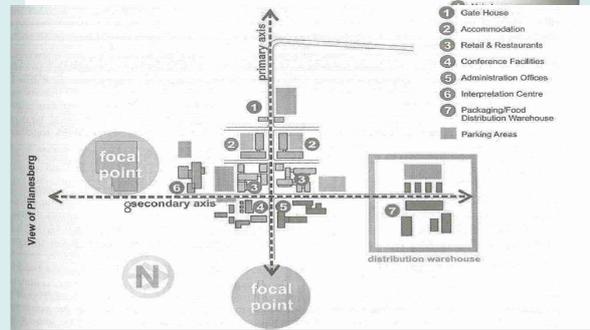
KERNCLIFF PARK



Proposed Kruidfontein Mining Project within the proposed Heritage Park Corridor



Plan of the mine Infrastructure incorporating post-closure end use



Conclusions

- Think of the end before you begin



Thank You