# Mining and Biodiversity in South Africa: A Discussion Paper

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## Scope of this paper

This paper focuses on biodiversity conservation planning and how it provides a useful tool for land-use planning and impact assessment in the mining sector in South Africa.[1] The mining sector is a major landowner and land user in South Africa, and has considerable obligations in terms of our policy and legal framework to take biodiversity into account in its plans and activities. Recent advances in biodiversity conservation planning provide tools that can help achieve exactly that. We use an example from the Succulent Karoo biome, a global biodiversity hotspot, to illustrate how conservation planning can build the basis for effective engagement between the conservation sector and the mining sector, to reduce the impact of mining on biodiversity and in some cases to promote a net benefit to conservation.

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[1] Sections of this paper draw on Driver, A., Cowling, R.M. and Maze, K. 2003. *Planning for Living Landscapes: Perspectives and Lessons from South Africa*. Washington, DC: Centre for Applied Biodiversity Science at Conservation International; Cape Town: Botanical Society of South Africa. (Available at www.botanicalsociety.org.za/ccu from October 2003.)

## 1. Introduction

The long-term survival and well-being of people depends on effective conservation of the world's biodiversity. South Africa ranks as the third most biologically diverse country in the world, and as such is of major global importance for biodiversity conservation. Pressures on biodiversity are numerous and show little sign of abating. Yet we have limited resources, both human and financial, for conservation action. This means that we have to be strategic – to focus our efforts where they make the greatest contribution to conserving biodiversity in the long term. Loss of natural habitat is the single biggest cause of biodiversity loss in South Africa and much of the world. This means that focusing conservation action on reducing habitat loss in ecosystems is often the most effective way of ensuring we maintain living landscapes to sustain future generations. Systematic conservation planning is a tool that can assist us in identifying priority areas and actions required to do this.

The term "conservation" is often associated with formal reserves or protected areas behind fences. While protected areas are important, they need not be the main concern or the primary focus of conservation planning. Conservation is relevant to every part of the landscape, from cities to farmers' fields to untouched wilderness areas, and can be incorporated into productive sectors such as agriculture, mining and urban development. It is vital to engage these sectors in meaningful conservation action, and not to see the conservation sector as distinct from the rest of our economy. Especially in South Africa, biodiversity conservation is an integral part of our economy, livelihoods, and quality of life.

In South Africa, as in most other biologically diverse parts of the world, most biodiversity, including many priority areas, does not fall within existing protected areas. While mining in formal protected areas and world heritage sites are important issues, mining in any ecosystem that is threatened or not represented in the protected area system is potentially problematic. It is therefore critical that this issue features prominently in any debates or dialogues about mining and biodiversity.

South Africa's extraordinary biodiversity presents challenges for land-use planning and decision-making. It is not surprising therefore that the mining sector has frequently clashed with biodiversity sector. Certain types of mining result in irreversible loss of natural habitat across large areas. Where mineral deposits are located in biodiversity-rich areas, this inevitably results in competing land-use needs between mining and conservation. In most cases the conditions for mining approval have been weak and of little value from a biodiversity conservation point of view. Even in cases where tradeoffs have been offered these are frequently not of the same value as the biodiversity that is being lost. Impacts have been assessed in terms of species-level concerns rather than landscape-level or ecosystem-wide concerns, and have often not been evaluated in regional context. Mitigation of impacts has mainly focussed on rehabilitation, and search and rescue of plants and animals. These haven't really addressed the problem.

The mining sector is not all to blame for this. Until recently (within the last decade), we have not had biodiversity conservation planning tools to assist us in addressing impacts on biodiversity at the level of ecosystems and habitats or to place these impacts in a regional context. Biodiversity conservation planning tools enable us to identify critical areas a priori, or at least to factor them into the assessment.

This paper explores the role of the mining sector in conservation in South Africa, specifically how it can use systematic conservation planning to reduce impacts and contribute to biodiversity conservation on its properties in the biodiversity rich areas.

Section 2 describes the policy and legal setting for the mining sector in relation to biodiversity. Section 3 presents an overview of systematic conservation planning. In section 4 the relevance of systematic conservation planning for land-use planning in the mining sector is discussed. Sections 5 & 6 present examples of how systematic conservation planning has been successfully applied in the mining sector in South Africa.

## 2. Overview of policy and regulatory requirements for mining sector in relation to biodiversity.

In South Africa the mining sector is governed by legislation specific to mining as well as general legislation that applies to all sectors.

### *2.1 Mining legislation*

Two key pieces of mining legislation are relevant here, backed by framework environmental legislation:

- the Mineral and Petroleum Resources Development Act 28 of 2002;
- Draft Regulations under the Mineral and Petroleum Resources Development Act 28 of 2002 (6 December 2002).

This relatively new mining legislation contains much more extensive and stringent environmental requirements than previous legislation. The Minerals Act of 1991 made environmental programme reports mandatory but in essence this just required "orderly use and rehabilitation". The legislation was weak, did not provide for a "no go" option, and fell hugely short of biodiversity conservation objectives. In contrast, the new Mineral and Petroleum Resources Development Act stipulates that the National Environmental Management Act (NEMA) must be applied to all mining activity. This means that over and above the previous requirements, alternatives must be considered, cumulative impacts must be taken into account, and ecosystem sustainability must be planned for at every stage of the mining lifecycle.

Some of the requirements of the Mineral and Petroleum Resources Development Act 28 of 2002 are:

- National environmental management principles apply to all prospecting and mining operations. NEMA principles are discussed in Section 2.2 below.

- *An Environmental Impact Assessment* is required to apply for mining right [S22]. Such right granted if the mining will not result in unacceptable pollution, ecological degradation or damage to the environment [S23(1)]. Compliance with Integrated Environmental Management requirements as given in S5 of the National Environmental Management Act (including, amongst others: consultation with interested and affected parties, consideration of alternatives; consideration, assessment, investigation and communication of environmental impacts; management of environmental impacts)

- *Environmental Management Plan or Programme* to manage and rehabilitate impact of prospecting, reconnaissance, exploration or mining operations. Financial provision must be made for rehabilitation and management of negative impacts. The following, amongst others, should be covered:

    - Management objectives and goals

- Arrangements for monitoring and performance assessment

The Department of Minerals and Energy's Draft Regulations under the Mineral and Petroleum Resources Development Act 28 of 2002 [6 December 2002], include the following requirements:

- Ecological sustainability given high profile in Draft Regulations: Provision for the Minister to turn down applications to mine at Scoping stage [S31] or Environmental Impact Assessment stage [S34] on grounds of negative ecological impact - If the Scoping or Environmental Impact report indicates that the proposed mining operation will result in "*unacceptable pollution, ecological degradation or damage to the environment*", the Minister "must refuse the application" [S31]. If no such unacceptable impacts, then an environmental impact assessment to be carried out and environmental management plan/programme to be prepared.

- Specifically asks for cumulative impacts on "specific resources and ecological components" to be addressed in scoping [S31] and environmental impact assessment reports [S32]. This requirement is important; "cumulative" being defined largely as follows:

    - Proposed operation is one of several in the same geographic area

    - Other projects or activities (ie not mining) in same area impact similarly on resources and ecological components

    - Selection of geographic and time boundaries under consideration should be based on the "natural boundaries of the resources of concern" and the period of time that the proposed project's impacts will persist.

- Environmental Impact Assessment, amongst others, to

    - Evaluate potential significance of impacts of proposed mining, reasonable alternatives and mitigation measures for each and every impact.

    - Identify knowledge gaps, uncertainties, adequacy of predictive methods and underlying assumptions.

    - Give arrangements for management and monitoring, and assess effectiveness thereof after implementation.

### *2.2 General legislation*

Mining is governed not only by legislation that deals specifically with minerals and energy, but also by environmental and land-use planning legislation applicable to all sectors.

#### *2.2.1 Environmental legislation*

The National Environmental Management Act (NEMA) (Act 107 of 1998) is broad framework legislation. It is binding on all sectors and is intended to override other legislation in cases of conflict that deal specifically with environmental management. NEMA principles include, amongst others:

- Avoiding or, where not possible to altogether avoid, minimising and remedying disturbance of ecosystems and loss of biological diversity, pollution and

degradation of the environment, disturbance of landscapes and sites that constitute the nation's cultural heritage, negative impacts on the environment.

- A risk-averse and cautious approach should be applied, taking into account effects of decisions on all aspects of the environment and all people in the environment by pursuing the best practicable environmental option.

- The environment is held in public trust for the people, the beneficial use of resources must serve the public interest and the environment must be protected as the people's common heritage.

- Environmental justice must be pursued to that adverse environmental impacts aren't distributed in a way that unfairly discriminates against any person, particularly disadvantaged or vulnerable persons.

- Sensitive, vulnerable, highly dynamic or stressed ecosystems require specific attention in management and planning procedures, especially where they are subject to significant development pressure.

- The use and exploitation of non-renewable natural resources should be responsible and equitable, and take into account the consequences of the depletion of the resource.

The EIA regulations currently in place in terms of the old Environment Conservation Act (ECA) (Act 73 of 1989) require environmental impact assessments to be conducted for all listed activities. Listed activities do *not* include mining. These EIA regulations are due to be replaced by new regulations, which will be issued in terms of an amended section 24 of NEMA (NEMA 2$^{nd}$ Amendment Bill currently before Parliament). In the meantime, NEMA section 24(7) requires environmental assessment for all activities that may have a significant environmental impact *and* that require authorisation of some sort. This includes mining activity.

South Africa is a signatory of the Convention on Biological Diversity (CBD). This means that all sectors have a responsibility to uphold the principles and decisions of the Conference of Parties to the CBD. The Biodiversity Bill, before Parliament at the time of writing, aims to give effect to South Africa's obligations in terms of the CBD. It includes provisions for the Minister of Environment Affairs and Tourism to list threatened and protected ecosystems (in addition to threatened and protected species). It also includes provisions for the Minister to approve and publish bioregional plans. In terms of the Biodiversity Act, published bioregional plans will have to be taken into account in land-use planning and decision-making at the municipal level. National departments (including the Department of Minerals and Energy) that are required to prepare environmental management plans in terms of NEMA Ch3, will have to demonstrate how applicable bioregional plans are being implemented.

The Protected Area Bill, also before Parliament at the time of writing, is another relevant piece of legislation. It is likely to require permission from the Minister of Environmental Affairs and Tourism for prospecting or mining in any formal protected area. This is different from the current situation, which requires permission only from the Minister of Minerals and Energy.

### *2.2.2 Land-use planning*

The Municipal Systems Act requires all municipalities to produce Integrated Development Plans (IDP) that identify priority development needs through a consultative process with stakeholders. As part of its IDP, a municipality is required to produce a Spatial Development Framework (SDF) which sets out intended land-use patterns[2]. IDPs and SDFs are required to take the need for environmental sustainability into account. A new IDP and SDF should be drawn up every five years, with annual reviews in between. In both the IDP and SDF process the mining sector would be considered a stakeholder in relevant areas. However, the relationship between land-use planning and decision-making at the local level and in the mining sector is not clear. There is no obligation on the Department of Minerals and Energy to consult local government before giving approval to a mining application.

At the moment in South Africa, the fact that the Department of Mineral and Energy Affairs (DME) is both promoter and regulator of mining activities is viewed as problematic by other decision-making tiers and sectors as well as the environmental movement. Many people perceive the Department of Minerals and Energy and mining houses as a law unto themselves. Mining activities are not subject to as stringent land-use decision procedures as other land uses, because mining is not a listed activity.

## 3. What is systematic conservation planning?[3]

It is clear that recent and upcoming legislation places significant responsibility on the mining sector to take biodiversity into account in its activities, including decisions about land use. The question is how to do this. In the last decade in South Africa major advances in the field of systematic conservation planning have been made. Systematic conservation planning provides tools to take biodiversity into account in land-use planning and decision-making in all sectors, including mining.

The aim of conservation planning is to identify which areas of land and sea are crucial for ensuring a living landscape,[4] and to focus conservation action on these priority areas. Given that we cannot conserve everything, we need to ask: which areas do we need most to ensure living landscapes, and how can we act to ensure that loss of natural habitat is avoided *in these priority areas*? Conservation planning also needs to include the development of a strategy and action plan to implement the planning outcomes (this is discussed further under section 5).

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[2] For more information on the preparation of IDP's and SDF's see www.dplg.gov.za/publications for the: Integrated Development Planning Guide Pack, Department of Provincial and Local Government. This guide pack contains detailed descriptions on how municipalities go about preparing IDPs and SDF's including assessment tools, consultative processes, decision-making criteria, etc.

[3] For further discussion on this, see Driver et al. 2003. *Planning for Living Landscapes: Perspectives and Lessons from South Africa*, on which this section draws.

[4] A living landscape is a landscape that is able to sustain life of all forms for generations to come. We use the term "living landscape" to emphasise that we are concerned not just with formal protected areas or protecting individual species.

### *3.1 Starting points: representation and persistence*

The systematic approach to conservation planning has become widely used and accepted in South Africa as well as in many other parts of the world. The starting point of the systematic approach is that, if we want to conserve biodiversity effectively, we need to conserve:

- a *representative sample* of all biodiversity;
- the *ecological and evolutionary processes* that allow this biodiversity to persist over time.

The first requirement is referred to as the *principle of representation*. We want to conserve a representative sample of all species, and of the habitats in which they occur (for no species can survive in the long term in isolation of its natural habitat). However, conserving species and habitats, often referred to as biodiversity pattern, is not enough. It simply gives us a snapshot of the biodiversity that currently exists. If we wish this biodiversity to persist over time, we also need to make sure that the ecological and evolutionary processes responsible for maintaining and generating biodiversity are conserved. This second requirement is referred to as the *principle of persistence*.

All over the world, conservation action has tended to focus on establishing systems of formal reserves. The location of these reserves has often been driven by factors that have little to do with conserving biodiversity pattern or ecological processes. For example, reserves are frequently located where available land is cheap (often in mountainous areas where there are few other suitable or feasible land uses), or where the scenery is spectacular, or to conserve a single species.

This means that, the world over, systems of formal reserves do not do a good job of conserving biodiversity. They are biased in favour of habitats that have no direct productive value in the market economy, so they do not include a representative sample of species and habitats, and they exclude key ecological and evolutionary processes. Systematic conservation planning identifies gaps in our protected area system. However addressing these gaps need not be limited to the expansion or establishment of formal protected areas. The role of land users including agriculture and mining in contributing to achieving conservation targets needs to be promoted.

Conservation planning should inform the work of conservation agencies on the one hand, and broader land-use plans and decisions on the other, as illustrated in Figure 1. Conservation action should include working with landowners, land users and land-use decision-makers in all sectors to encourage land-use decisions and land-management practices that protect biodiversity in priority areas. The focus on priority areas allows for recognition of competing land uses and development needs, which is important if we want to involve stakeholders from a range of sectors in conservation action. Conservation action also includes ensuring that economic benefits from biodiversity are realised and flow to local communities.

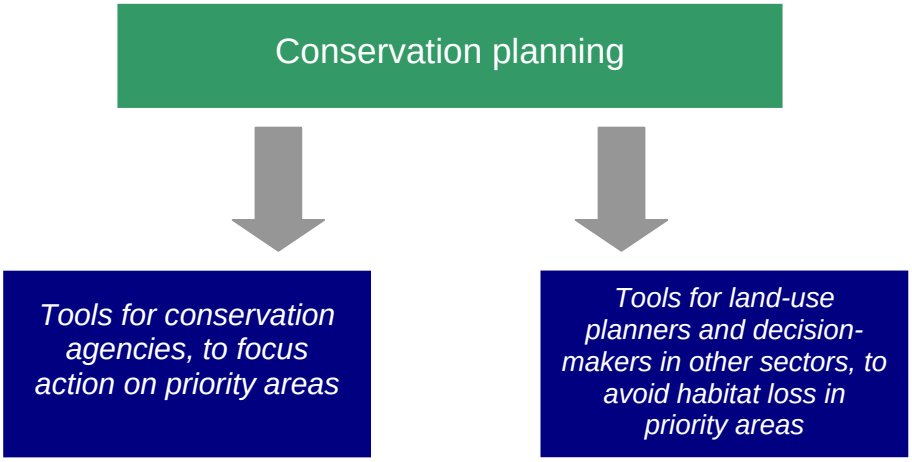


**Figure 1: Conservation planning should inform the work of conservation agencies as well as land-use planning and decision-making in other sectors**

### *3.2 How much is enough? Conservation targets*

Once we've established the need to conserve a representative sample of biodiversity combined with key ecological and evolutionary processes, they next question is: *how much* do we need to conserve to ensure a living landscape? How big does the sample of biodiversity pattern need to be? How much land is required to ensure the functioning of ecological processes?

The systematic approach to conservation planning involves setting *quantitative conservation targets* that answer these questions. A target might be, for example, a certain number of hectares of a particular vegetation type, or a number of occurrences or populations of a species, or a number of hectares of a river corridor. Conservation targets are quantitative and explicit, and can be set for any biodiversity feature. Quantitative, scientifically derived targets that meet requirements for representation and persistence are a defining feature of systematic conservation planning. They set the systematic approach to conservation planning apart from many other approaches to conservation planning that rely heavily on opinions of individuals.

The World Conservation Union (IUCN) recommends that 10% of each country or region should be under conservation management. This 10% is an arbitrary figure, chosen as much for its political acceptability as for any other reason. It does not take into account that different natural features may require different degrees of protection, and provides no guidance about which natural features should be included in the 10%. Conservation targets can be set more systematically and reliably using data-driven, scientifically defensible methods to determine how much is enough.

In South Africa we have developed a method for setting targets for ecosystems and habitats based on species-area relationships. This method results in higher targets for species-rich habitats than for species-poor habitats, to ensure that all species are represented.  Targets derived in this manner are powerful in that they are data-driven and defensible.

The starting point of systematic conservation planning is: we don't need to conserve everything. We simply need to meet our quantitative conservation targets for biodiversity pattern and ecological processes in order to achieve a living landscape. This allows us to identify *priority areas* for biodiversity conservation, instead of attempting to focus conservation action on the entire landscape, and sets the scene for constructive dialogue and collaboration with other socio-economic sectors.

Systematic conservation planning provides a defensible identification of geographic priority areas for conservation action. Non-systematic or expert-driven approaches to conservation assessment can also result in the identification of a set of geographic priority areas for conservation, but these are much more difficult to defend, and much more difficult to use as a basis for engaging stakeholders in other sectors. We have found that stakeholders from a range of sectors respond well to conservation assessment outcomes that are based on identifying a set of options for meeting scientifically set conservation targets, rather than outcomes based on a group of experts or conservationists identifying the areas that are important in their opinion.

### *3.3 Planning at different scales*

Spatial planning of all kinds, including systematic conservation planning, can be done at various spatial scales.[5] Plans at different scales answer different questions and can be applied in different ways. Broad-scale conservation planning (i.e. 1:250 000 or broader) can be applied to, for example, a whole bioregion or ecoregion (such as the Cape Floristic Region or Succulent Karoo), and results in the identification of *broad priority areas* for conservation action. Fine-scale plans are needed within priority areas to design protected area networks and to inform land-use planning and decision-making outside formal protected areas.

Fine-scale conservation planning (at 1:50 000 scale or finer) is not required across the entire landscape. If we had limitless resources we might consider doing fine-scale conservation plans across the entire landscape, but given resource constraints, it makes sense to focus fine-scale planning initiatives on areas that have been identified in a systematic broad-scale conservation plan as priority areas for conservation action. This results in a nested system of broad-scale and fine-scale plans.

Examples of systematic conservation planning at both scales in the Succulent Karoo biome are shown in Figure 2 and discussed in sections 5 & 6.

### *3.4 Existing systematic conservation plans in South Africa*

Broad-scale systematic conservation plans have been completed for three of South Africa's most diverse biomes: the Cape Floristic Region (or fynbos biome), the Succulent Karoo biome, and the Thicket biome. A provincial systematic conservation plan has been completed for KwaZulu-Natal. Fine-scale systematic conservation plans have been completed for several priority areas within the CFR, Succulent

[5] The concept of scale is not simply about the size of the area being planned for, although broad-scale plans tend to be done for large areas, and fine-scale plans tend to be done for smaller areas. Scale has to do with the degree of spatial error associated with the data inputs and the outputs of the plan, and with how the outputs can be interpreted and applied on the ground. A scale of 1:250 000 (commonly used for regional conservation plans) means that 1cm on the map represents 2.5km on the ground. A point or a line on a 1:250 000 map may be out by 250m on the ground, even if it has been accurately mapped.

Karoo and Thicket biomes. There are initiatives underway to complete similar broad-scale plans for the Grassland and Forest biomes.

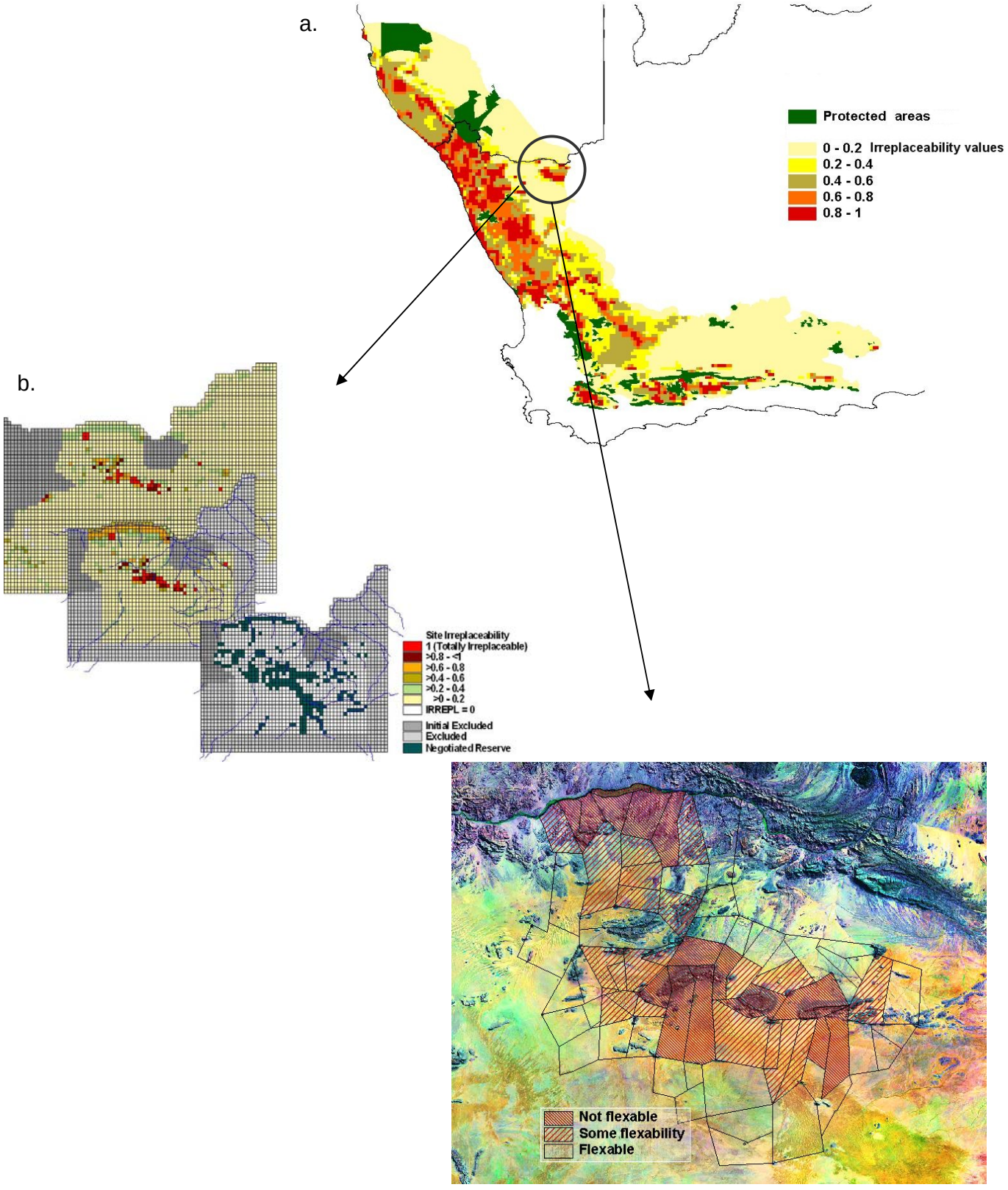


**Figure 2: Examples of outputs of a broad-scale conservation plan and a fine-scale conservation plan in the Succulent Karoo. (a) shows a map of conservation options for the whole Succulent Karoo biome, based on a broad-scale conservation plan. (b) shows finer scale maps of conservation options for the Bushmanland region, one of the geographic priority areas identified in the broad-scale plan.**

## 4. Why is systematic conservation planning relevant to the mining sector?

As we described in Section 2, the policy and legal framework for mining and land-use planning in SA places responsibility on the mining industry to take impacts on biodiversity into account. The challenge for the mining sector is two-fold: to quantify its impacts and take measures to avoid negative impacts; and, as a major landowner and land user, to contribute actively to achieving conservation targets.

Systematic conservation planning is relevant for the mining sector for at least three reasons.

1. It provides clear and reliable information on where biodiversity priorities are so that negative impacts can be avoided or reduced.
2. It provides an opportunity for mining sector to be involved as a stakeholder in the conservation planning process.
3. It provides guidance to mining companies on how they can contribute directly to the achievement of conservation targets.

### *4.1 Clear and reliable information*

Systematic conservation planning provides clear and reliable information on where biodiversity priorities are, providing a reliable point of departure for assessing and evaluating biodiversity impacts of proposed mining activities. So mining companies and regulators are able to take these priorities in to account in their decision-making at all stages of the mining lifecycle. If a systematic conservation plan exists for an area, it facilitates the screening of mining applications with respect to rapid identification of those applications where potentially significant or unacceptable negative impacts on ecosystems are likely. This means mining companies can avoid long legal battles about biodiversity impacts because they know up front where potential red flags are.

Information from systematic conservation plans also provides justifiable arguments for decision-makers for recommending – or insisting on – ways of avoiding or minimising negative impacts on biodiversity in all phases of mine lifecycle. These could include “no-go” areas of mining, mining strategy and methods (e.g. underground rather than surface), direction of mining (to allow for adequate rehabilitation/recovery), and methods of rehabilitation. A systematic conservation plan can help in identifying what the rest target should be post mining (for example, should an area be restored as an ecological corridor, back to its original state to meet conservation targets, or can it be converted to agricultural use?). Systematic conservation planning products should include, together with maps, guidelines on biodiversity management as well as guidelines on restoration targets.[6]

Another application of systematic conservation planning is that it gives a sound basis for assessing and evaluating overall cumulative impacts of mining activity within and between ecosystems, habitats and communities where there is more than one mining company operative, or one company with a number of mines.

[6] Systematic conservation planning is a rapidly evolving field. An area in which we are taking strides and learning important lessons is how to interpret the results of a systematic conservation plan to provide the most meaningful products possible for stakeholders in a range of sectors. We recognise that maps of biodiversity priorities need to be accompanied with guidelines on land-use management in these areas. However, existing conservation planning products often do not yet include such guidelines.

Finally because systematic conservation planning gives an objective, defensible perspective on potential significance of mining-related impacts on biodiversity and ecosystems, this sets the scene for sound negotiation with respect to appropriate and reasonable trade-offs, actions mining company could undertake to offset impacts and risks, etc. Systematic conservation planning a promising tool to further explore offsets.

### *4.2 Opportunity for mining involvement in conservation planning*

In addition to producing spatial information on where priorities are and guidelines for ecosystem management, systematic conservation planning should include the development of a conservation implementation strategy and action plan. If this is done properly and honestly, it provides an opportunity to for the mining sector to engage together with other land-use sectors, including the conservation sector, in a constructive process that develops a strategy and action plan for conserving biodiversity. Such a process encourages all sectors to see themselves as custodians of biodiversity in the region concerned, and to explore their possible roles in conserving biodiversity. In section 5 below we discuss an example of a conservation planning initiative in the Succulent Karoo in which this was achieved.

### *4.3 Opportunity for mining to contribute to meeting conservation targets*

The role of the mining sector in biodiversity conservation can extend beyond minimising or avoiding negative impacts of mining activity. Often major landowners, mining companies can contribute directly to meeting conservation targets by participating in innovative conservation initiatives such as the establishment of multi-owned protected areas. It is not necessary (or possible, because of resource constraints) to achieve conservation targets solely within state-owned formal protected areas. Increasingly, other models for the establishment and management of protected areas are being explored in South Africa, in which conservation agencies work together with private and communal landowners. Section 6 presents an example of such an initiative involving the mining sector that is underway in Bushmanland.

## 5. An example from the Succulent Karoo Hotspot

The Succulent Karoo biome in South Africa and Namibia is one of 25 internationally recognised biodiversity hotspots (see the Box 1 on page 17) and is an extraordinary global treasure. With more than 6300 plant species, 250 bird species, 78 mammal species, 132 reptile and amphibian species, and an unknown large number of insect species, it is the world's most diverse arid environment. More than 40 per cent of these species are found nowhere else on Earth. However, only 3.5% of the Succulent Karoo's total area is protected.

Despite low population densities, there are many challenges for conservation in the region. Prospecting and exploitation of regional mineral deposits by small and large mining companies, irrigated agriculture and overgrazing have transformed much of the landscape. This alarming fact, combined with the looming potential impact of climate change on the biodiversity in this ecosystem and limited economic alternatives within the arid landscape, prompted a desire to develop a regional strategy for conservation.

The Succulent Karoo Ecosystem Programme (SKEP) evolved as a bi-national initiative that seeks to develop a strategy for conservation and sustainable land-use in the Succulent Karoo. The objectives of the programme are far-reaching in scope.

Geographic priority areas are identified and actions recommended to focus conservation and development investment on those areas and activities that provide the greatest benefits to biodiversity in the short- and long-term. The overall vision for SKEP is that:

*"The people of the Succulent Karoo take ownership of and enjoy their unique living landscape in a way that maintains biodiversity and improves livelihoods now and into perpetuity."*

Components of a 20-year strategy for achieving the vision and targets were identified during the SKEP planning phase.[7] Although broad focal areas and priority actions for the next 20 years are recommended, SKEP will be an evolving strategy adapting to circumstances as necessary to achieve the vision.

The planning phase of SKEP used a consultative and inclusive approach, combined with a rigorous scientific process to identify geographic biodiversity priority areas (see Figure 3 and Annex 2), to develop this 20-year Conservation and Sustainable Land Use Strategy for the Succulent Karoo Hotspot. It set out to obtain information and generate consensus among stakeholders for a holistic conservation and sustainable land-use plan for the Succulent Karoo. SKEP involved more than 60 scientific experts and 400 local stakeholders representing government, academia, NGOs, private sector interests and local communities in a groundbreaking approach to conservation planning. As SKEP moves into implementation phase it will continue to test and expand innovative approaches that will involve people of the region to support sustainable development and promote conservation of this unique hotspot.

The SKEP planning phase involved a series of workshops in different subregions throughout the biome, which were attended by a range of sectors. In the Namaqualand and southern Namibia sub-regions the mining sector is an important stakeholder. Stakeholders from the agricultural, mining, tourism and local government sectors participated in geographically decentralised information gathering and action planning workshops, in which they were treated as equal players, and as custodians of biodiversity rather than "threats" to biodiversity. For many people in these sectors, this prompted a new way of viewing themselves. For the first time they were able to see themselves as contributors to biodiversity conservation, not simply in terms of reducing their impact but also in terms of making an active positive contribution. Because of the transparency and defensibility of the systematic conservation planning approach, these stakeholders readily accepted the results of the conservation assessment. Priority areas for biodiversity conservation had clearly been identified based on defensible science rather than subjective judgement by those with vested interests in the conservation sector.

At the end of this planning phase the Critical Ecosystem Partnership Fund (CEPF)[8] allocated $8 million to implementing part of the SKEP strategy over a five-year period. CEPF chose specific strategic funding directions and investment priorities to focus on. The relevant ones for the mining sector are:

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[7] Information in this section is based on the *SKEP 20 Year Strategy* published in 2003 and available from www.cepf.net or www.dlist.org (in the SKEP kiosk).

[8] The Critical Ecosystem Partnership Fund (CEPF) is designed to safeguard the world's threatened biodiversity hotspots in developing countries. It is a joint initiative of Conservation International (CI), the Global Environment Facility (GEF), the Government of Japan, the MacArthur Foundation and the World Bank. CEPF supports projects in hotspots, areas with more than 60 percent of the Earth's terrestrial species in just 1.4 percent of its land surface. For more information see www.cepf.net.

1. Expand protected area corridors through public-private-communal partnerships in the priority areas of Bushmanland-Gamsberg, Central Namaqualand Coast, Namaqualand Uplands, Knersvlakte, Hantam-Roggeveld, Central Little Karoo, and the Sperrgebiet.

2. Engage key industrial sectors in meeting conservation objectives identified by SKEP. Under this strategic direction there are two specific investment priorities that involve mining. These are:
   (i) Support mining forums of corporate and small-scale mining enterprises to discuss and develop mechanisms for addressing biodiversity concern; and,
   (ii) Direct corporate investment into conservation projects that contribute to conservation targets and regional development objectives.

Any organisation except government is eligible to apply for CEPF funding for projects that fall within these strategic funding directions.

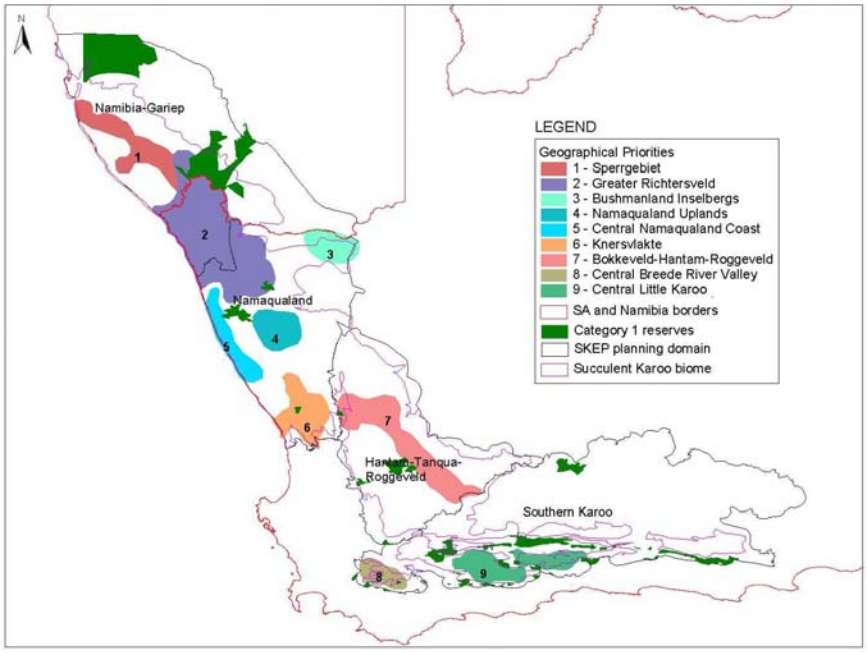


**Figure 3: SKEP identified nine broad priority areas for conservation action in the Succulent Karoo Hotspot**

## 6. Case study: Bushmanland Conservation Initiative

In 1999 Anglo American proposed the Gamsberg Zinc Project in Bushmanland, a large open pit mine on a quartzite inselberg[9] in the heart of a pristine biodiversity hotspot. The proposed R5.5 billion mine will create a hole some 2 x 3 km wide and 600m deep – 200m deeper than the Kimberly hole. The mine will also create approximately a thousand jobs in an area with minimal economic resources. In the face of one of the world's largest mining companies and forecasts of R2,2 billion

[9] An inselberg is an island mountain. In the Bushmanland region, there are many inselbergs surrounded by sandy plains. The inselbergs provide unique habitats, found only in the Succulent Karoo biome, and home to a spectacular array of endemic dwarf succulents.

annual export earnings from the operation, the environmental lobby that opposed the mine was tackling a Goliath. But their concerted efforts managed to shake Anglo to the core. Top personnel flew in for angry meetings with the environmental lobby. The often-conflicting imperatives of development and conservation collided head on.

What began as a confrontation between mining and conservation has gradually changed the way Anglo American Base Metals viewed their responsibilities towards biodiversity conservation and then catalysed their direct involvement in implementing conservation action that meets conservation targets. This case study is an example of how systematic conservation planning, at the broad and fine scales, contributes to building the basis for effective engagement between mining and biodiversity sectors.

The biodiversity sector involvement in the Gamsberg Zinc Project began in 1999 during the environmental impact assessment that was undertaken for the mine and associated infrastructure. The assessments undertaken for biodiversity were adequately detailed and even included an assessment of the 14 surrounding quartzite inselbergs in order to place the impacts of the proposed Gamsberg mine in a regional context. This regional analysis showed the Gamsberg to be the single most important site for biodiversity conservation in region, since it contained the most extensive areas (70%) of the unique fine quartz patch habitat as well as three new plant species and largest populations of several threatened plants species.

While these biodiversity specialist studies were thorough, there was concern from the biodiversity sector that the impacts had not been adequately recognised in the overall environmental assessment, in that the global and national significance of the area was not fully acknowledged and that the proposed mitigation measures were inadequate. As tensions built between the parties, there was no space for constructive engagement. This was when a conservation agency commissioned a fine-scale conservation plan to identify options for achieving conservation targets (figure 2b). This study was intended to lay the basis for negotiation on mitigation measures to offset the impacts of the open pit, however the complete lack of trust and the lack of precedent made Anglo retreat into a corner, and eventually led to a stalemate between Anglo and many of the conservation NGOs involved. What Anglo was offering as compensation did not have the support of the majority of NGOs and biodiversity specialists in the region. Shortly after this unsatisfactory process the mine project was placed on hold due to low zinc prices.

With the project on hold a breathing space was provided. While the heated debates over the Gamsberg project simmered down, important developments took place that facilitated constructive engagement between the conservation and mining sectors within the region.

In 2002, two synchronous, though independent, conservation initiatives helped ensure that the Gamsberg Inselberg and Bushmanland region remained high on the conservation agenda and these created a foundation for the conservation sector to re-engage with Anglo to work towards a better deal for biodiversity in the proposed mining operations in Bushmanland. These were the International Council for Mining and Minerals Toronto declaration on biodiversity, in which Anglo committed to improved biodiversity practises particularly around *in situ* conservation efforts, and the SKEP programme described in section 5 above. Both of these initiatives were key in getting Anglo to better understand its role not just in minimising impacts but also in playing a direct positive role as a custodian of large tracts of biodiversity.

At the ICMM Toronto Declaration of May 2002, Conservation International persuaded Anglo to heed the cries of the conservation lobby and establish a partnership with the

sector to ensure better investment by the mining house in conservation initiatives linked to the Gamsberg mine.

The second initiative that increased the profile and support for the conservation of the biodiversity of the Bushmanland area was the launch of SKEP in January 2002. Using systematic conservation planning techniques, the programme identified nine broad priority areas within the region for conservation action. Bushmanland was one – again bringing attention to the area as a hotspot of biodiversity.

During the SKEP planning process the dialogue between biodiversity and Anglo continued and an agreement was reached to establish a partnership project – the Bushmanland Conservation Initiative (BCI). This partnership project between conservation NGOs, the mining company and local communities aims to establish a multi-owned protected area through a variety of innovative interventions and mechanisms that draw in local landowners. This protected area will achieve conservation targets for biodiversity features in this priority area. It will be nested within a multi-use landscape with areas under high protection, others being managed for extensive grazing and a third category being set aside for more intensive development activities, including mining. The BCI will develop local conservation management capacity through training of local community members as conservators within the project management team.

The initiative aims to demonstrate best practice lessons for the engagement between mining and conservation. Central to this is creating a culture in which mining not only minimises adverse environmental impacts within its operations, but, further, works to positively enhance *in situ* biodiversity conservation. Anglo has made an in-principle commitment to make a substantial contribution to the BCI. This will include setting aside the land surrounding the Gamsberg mine for conservation within the BCI.

Although it is still early days for the BCI and many lessons will be learnt in the years ahead, without systematic conservation planning it would not have been possible to: (i) determine the impacts of the Gamsberg mine; (ii) suggest meaningful mitigating measures; (iii) build credibility of biodiversity goals, and, (iv) provide a means for a contribution from the mining sector that contributes directly to meeting biodiversity conservation targets.

## 7. Conclusion

We have identified three key factors that have contributed to the improved role of mining sector in biodiversity conservation in South Africa:

- firstly, the introduction of systematic conservation planning methods has provided a powerful tool for identifying priority areas for biodiversity conservation;

- secondly, the growing awareness about biodiversity in the mining sector as well as their growing receptiveness to biodiversity issues;

- lastly, the changing legal and policy framework, including NEMA and the Biodiversity Act, that increasingly requires all sectors to take biodiversity into account in a meaningful way in their decisions and actions.

Biodiversity is everyone's business. By treating all sectors as custodians of biodiversity rather than as threats to biodiversity, and involving them in developing a conservation strategy and action plan, stakeholders are able to view themselves as positive contributors to conserving biodiversity in priority areas. The systematic

approach to conservation planning provides a powerful platform for mainstreaming biodiversity priorities across a range of sectors and finding mutually beneficial solutions, enabling us to meet and maintain conservation targets that support living landscapes.

**Box 1**

WHAT IS A HOTSPOT?

In a world where conservation budgets are insufficient given the number of species threatened with extinction, identifying conservation priorities is crucial. British ecologist Norman Myers defined the biodiversity hotspot concept in 1988 to address the dilemma that conservationists face: what areas are the most important for preserving species?

Two factors are considered for hotspot designation. Hotspots are regions that harbour a great diversity of endemic species and, at the same time, have been significantly impacted and altered by human activities. Plant diversity is the biological basis for hotspot designation; to qualify as a hotspot, a region must support 1 500 endemic plant species, 0.5 per cent of the global total. Existing primary vegetation is the basis for assessing human impact in a region. To qualify as a hotspot, a region must have lost more than 70 per cent of its original habitat. Plants have been used as qualifiers because they are the basis for diversity in other taxonomic groups and are well known to researchers. Typically, the diversity of endemic vertebrates in hotspot regions is also extraordinarily high.

The hotspot concept targets regions where the threat is greatest to the greatest number of species and allows conservationists to focus cost-effective efforts there. The 25 biodiversity hotspots identified to date contain 44 per cent of all plant species and 35 per cent of all terrestrial vertebrate species in only 1.4 per cent of the planet's land area.

## 8. Annex 1

### Technical steps in the SKEP conservation planning process

| Step | Action |
|---|---|
| 1 | Compile data on biodiversity pattern (must include a continuous data layer e.g. of vegetation types) |
| 2 | Compile data on ecological and evolutionary processes, and represent spatially where possible |
| 3 | Identify transformed areas |
| 4 | Identify types, patterns and rates of future land-use pressures, and represent spatially where possible |
| 5 | Identify areas that are already protected |
| 6 | Set targets for the representation of biodiversity pattern and processes |
| 7 | Lay out options for achieving targets and identify geographic priorities for conservation action |

The technical steps listed above are described briefly below.

- In Step 1 data on biodiversity pattern is compiled. This usually involves compiling a layer of **vegetation types or habitat units.** It is important that this step results in a continuous data layer – in other words, a layer that covers the entire planning domain (the area for which the conservation plan is being done). This continuous layer provides the basic set of biodiversity features for which conservation targets must be set. In addition to the continuous layer of vegetation types or habitat units, further information about biodiversity pattern, such as species distribution data, may be collected.
- In Step 2, **ecological and evolutionary processes** are identified, and spatial components of these processes are mapped where possible. The focus is on landscape-scale processes rather than small-scale processes. Small-scale processes will be "captured" within each of the vegetation types or habitat units identified in Step 1.
- In Step 3, areas where the natural habitat has been **transformed**, for example by urban development, agriculture or mining, are identified and mapped.
- In Step 4, likely **future land-use pressures** are identified, and mapped where possible (Figure 4 shows the predicted likelihood of mining in the next ten years, based on licence applications for prospecting and mining, combined with expert assessment of the likelihood of exploitation based on knowledge of the mineral deposits involved and market conditions. The likelihood of mining was scored high, medium, unknown, or none according to the criteria listed in the table below. More than 80% of the planning units have no likelihood of mining.)
- In Step 5, areas that are **already protected** are identified and mapped. Protected areas are usually divided into different categories depending on the degree of protection they confer.
- In Step 6, **conservation targets** are set for biodiversity features identified in Steps 1 and 2.
- Step 7 brings all this information together to produce a map of **conservation options**, i.e. options for achieving conservation targets. The conservation planning software called C-Plan was used to assist with this step in SKEP. The resulting conservation options map, or irreplaceability map, can be interpreted together with spatial information on expected

land-use pressures, to provide direction on **geographic priorities** for conservation action.

Note that some conservation plans involve a further eighth step, in which a protected area network that achieves the conservation targets is explicitly designed. This step, usually called "reserve design", results in *one* possible configuration of a protected area network – there are almost always many possible configurations of protected areas that achieve conservation targets. In the SKEP project, our aim was *not* to design a protected area network for the Succulent Karoo, but simply to identify broad-scale priority areas for conservation action. There was thus no reserve design step.

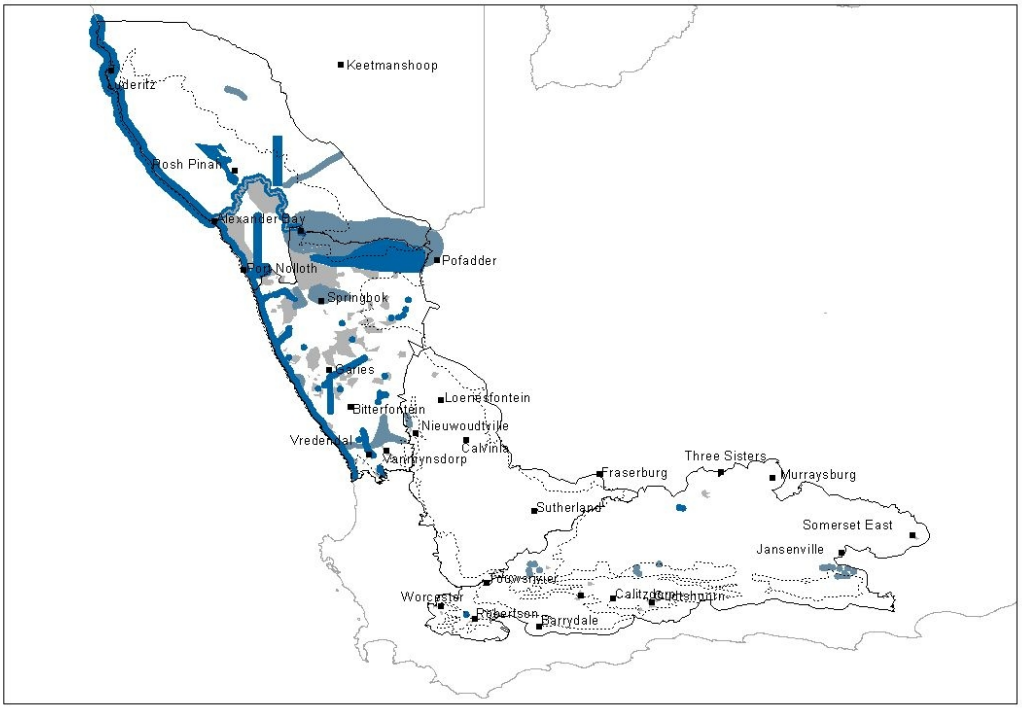


**Figure 4 The predicted likelihood of mining in the next ten years, based on licence applications for prospecting and mining, combined with expert assessment of the likelihood of exploitation based on knowledge of the mineral deposits involved and market conditions.**

**Criteria used to derive the likelihood of mining in the next ten years**

| Likelihood of mining | Criteria |
|---|---|
| High (H) | Parent parcel with licence application for high-return mineral<br>Mineral deposit for high-return mineral likely to be exploited in 10 years |
| Medium (M) | Parent parcel with licence application but exploitation of this mineral is uncertain<br>Mineral deposit for mineral likely to be exploited in 20 years |
| Unknown (U) | Parent parcel with licence for mineral unlikely to be exploited |
| None (N) | Everywhere else |