Planning for Living Landscapes

Perspectives and Lessons from South Africa

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PREFACE

Conservation planning in South Africa has taken strides forward in the last decade, particularly in relation to techniques in conservation assessment, and to closing the gap between planning and implementation. The primary scientific literature on conservation planning documents successes and achievements, but seldom focuses on problems and difficulties, especially with the implementation of conservation planning projects. Yet these are often the source of the greatest lessons and advances. In November 2002, a group of conservation planners in South Africa gathered in Cape St Francis to discuss and share lessons that had been learnt over the past several years in South Africa. This booklet was conceived at that workshop, at which we recognised the value of sharing our experiences with a broader audience of conservation scientists and practitioners.

The authors' thanks go to all the participants at the "**Lessons Learned**" workshop held in Cape St Francis in November 2002:

André Boshoff	*Terrestrial Ecology Research Unit, University of Port Elizabeth (TERU)*
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Mathieu Rouget	*IPC*
Andrew Knight	*TERU*
Amrei von Hase	*BotSoc*

This booklet is a collaborative project. The content is not the authors' alone, but was generated by insights from the people listed above, as well as numerous other colleagues with whom we have worked over the years.

In particular we would like to thank Kathy MacKinnon, Senior Biodiversity Specialist of the World Bank, for her role at the "Lessons Learned" workshop. There is a danger that a group of people who work closely together in a specific context become insular. Kathy provided an outside perspective based on many years of experience with biodiversity conservation projects all over the world.

We would like to thank the Centre for Applied Biodiversity Science at Conservation International (CABS), and the Botanical Society of South Africa, for providing funding for this booklet. Special thanks go to Mohamed Bakarr of CABS for his support of this project.

This booklet does not aim to prescribe. We are not advocating a single best way to do conservation planning, although we do subscribe to the principles of the systematic approach.[1] We are grateful to Bob Pressey and his colleagues in the New South Wales National Parks and Wildlife Service for introducing us to this approach. Especially in a discipline and practice that is evolving rapidly, a rich array of methods is appropriate – one doesn't want to stifle innovation in an attempt to standardise or converge on a single set of best practices or techniques. We aim to offer perspectives and lessons that may be useful in South Africa and beyond, not to provide a conservation planning manual. We refer to other sources that provide further guidance along the way, and in the section on further reading at the end.

Implementation of conservation action can take many forms, including long-term multi-sectoral conservation programmes that build on the foundation of conservation planning initiatives. We are learning many lessons in South Africa about how to run such programmes effectively; however, they are not the main focus of this booklet.

We hope that this booklet contributes to the continuing development of conservation planning excellence in South Africa and beyond, and to the achievement of conservation goals through appropriate planning that leads to effective implementation.

1. As described in Margules, C.R. & Pressey, R.L. 2000. Systematic conservation planning. *Nature* 405: 243-253.

Photo: Aton Pauw

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EXECUTIVE SUMMARY

WHY PLAN FOR LIVING LANDSCAPES?

The long-term survival and well-being of people depends on effective conservation of the world's biodiversity. This requires living landscapes: landscapes that are able to support life of all forms now and into the future. Pressures on biodiversity show no sign of abating, yet resources for conservation action are limited. This means we need to be strategic – to focus our efforts where they will have the greatest impact. Conservation planning gives us a tool for achieving this.

The aim of this booklet is to offer perspectives and lessons based on the South African experience of conservation planning, not to provide a conservation planning manual or to prescribe a single best set of techniques. In the rapidly evolving field of conservation planning, a rich array of methods is appropriate. However, we do subscribe to the principles of the systematic approach to conservation planning, used widely in South Africa and Australia since the 1990s.

THE SYSTEMATIC APPROACH TO CONSERVATION PLANNING

The starting point of systematic conservation planning is that we need to conserve:

- a *representative sample* of all biodiversity pattern, including species and their habitats (the principle of representation);
- the *ecological and evolutionary processes* that allow this biodiversity to persist over time (the principle of persistence).

All over the world, the location of protected areas has been driven by factors such as the availability of cheap land that is not suitable for uses such as agriculture, industry or urban development. This has resulted in gaps in our protected area networks, which do not do a good job of conserving biodiversity. They do not include a representative sample of all biodiversity, and they exclude key ecological and evolutionary processes.

HOW MUCH IS ENOUGH? CONSERVATION TARGETS

How much of the landscape is required to conserve biodiversity pattern and ecological processes? The systematic approach to conservation involves setting quantitative targets for biodiversity features. A target might be, for example, a certain number of hectares of a vegetation type, or a number of occurrences of a species, or a number of hectares of a river corridor.

Experience with systematic conservation planning shows that in most regions we need to conserve about half of the landscape in order to achieve living landscapes. The IUCN's recommended target of 10% is not enough. This does not mean that we need formal protected areas to cover half the landscape. It does mean that we need to work with a wide range of landowners and land users to ensure biodiversity friendly land management in priority areas inside and outside formal reserves.

CONSERVATION PLANNING IS NOT JUST ABOUT FORMAL RESERVES

Conservation planning is relevant to every part of the landscape. It's not just about establishing formal protected areas. The outcomes of conservation plans should inform not only the work of conservation agencies, but also land-use planning and decision-making in all socio-economic sectors.

Loss of natural habitat is the single biggest cause of biodiversity loss in South Africa and in much of the world. This means that it often makes sense to focus conservation action on preventing further habitat loss in priority ecosystems, in and out of protected areas, rather than on conserving individual species.

PLANNING AT DIFFERENT SCALES

Systematic conservation planning can be done in any landscape at any scale. Plans at different scales answer different questions and can be applied in different ways. Broad-scale plans (e.g. 1:250 000 scale) identify broad priority areas for conservation action. Fine-scale plans (1: 50 000 or finer) are needed within

these priority areas to design protected area networks and to inform land-use planning and decision-making outside protected areas. This gives us a nested system of broad-scale and fine-scale conservation plans that complement each other.

WHAT DOES IT TAKE TO DO A CONSERVATION PLAN?
SIX INGREDIENTS OF AN OPERATIONAL FRAMEWORK

It is all too easy for a conservation plan to end up being simply a technical or academic exercise that does not result in conservation action on the ground. To avoid this, every conservation plan requires an operational framework that lays the basis for implementation of the planning outcomes. In addition, we need to recognise that conservation planning involves both conservation assessment (identifying spatial priority areas for conservation action) AND the development of an implementation strategy and action plan. There is no recipe or single best way of establishing an operational framework for a conservation plan, but there are some key ingredients. We have identified six.

 # 1 Ask "Who wants this plan and what is it aimed at achieving?"

Important questions to ask before embarking on a conservation plan include: Who wants or needs this plan? Who will inherit the planning outcomes and what will they be used for? What is the organisational and institutional capacity for implementation? What are the likely implementation mechanisms? If there are not clear answers to these questions, the conservation plan is probably a supply-driven plan that will end up sitting on a shelf. We need demand-led plans with clear aims that take implementation opportunities and constraints into account. The aim of a conservation plan will depend on its spatial scale as well as who is commissioning the plan and who will inherit the planning outcomes.

 # 2 Pay attention to project design

It is worth investing time and resources in a consultative project design process that involves key stakeholders.

 # 3 Involve implementing agencies in the conservation assessment team

Implementing agencies need to be closely involved in the planning process, ideally as part of the conservation assessment team. Typically the implementing agency is a public sector conservation agency, but depending on the aim of the conservation plan, implementing agencies could include municipalities, NGOs, community-based organisations, even private companies, or a combination of these working in partnership.

 # 4 Involve stakeholders in a focused way that addresses their needs and interests

A great deal of time and resources can be wasted on poorly conceived, unfocused stakeholder involvement programmes. We have identified four lessons for getting extra mileage from stakeholder participation in a conservation plan.

- When dealing with other sectors, make the case for biodiversity. Biodiversity specialists often fail to be explicit about why biodiversity matters and how it contributes or could contribute to the local or regional socio-economy.
- Identify key stakeholders up front and understand their needs.
- Design a stakeholder participation programme with clear objectives. These could include building awareness, gathering information, building consensus on a vision and priority actions, building capacity and establishing institutions to implement the planning outcomes. Different stakeholders need to be involved in different aspects of the conservation planning process, and require different levels of detail with respect to the technical conservation assessment component of the plan.
- Avoid holding broad participatory workshops for the sake of it. Focused interactions are often more effective.

 # 5 Conduct the conservation assessment according to systematic conservation planning principles

Stick to systematic conservation planning principles in conducting the conservation assessment. Systematic conservation planning helps to provide a basis for constructive interaction with other socio-economic sectors by focusing on priority areas, recognising competing land uses and development needs, and setting defensible, transparent, data-driven conservation targets.

 # 6 Interpret the conservation assessment results, and mainstream the conservation planning outcomes

The spatial results of the conservation assessment need to be

interpreted for implementing agencies and a wider audience of stakeholders. The outcomes of the conservation plan, including spatial priorities and an implementation strategy and action plan, need to be embedded in the policies and day-to-day work and activities of people and organisations in a range of sectors.

THE CONSERVATION ASSESSMENT TEAM

Conducting a conservation assessment requires co-ordination skills, specialist skills, and a group of advisors. Investment in project co-ordination is crucial, especially in rapid, low-budget conservation plans. It is best to have a dedicated co-ordinator rather than to combine co-ordination and specialist functions in one person. The co-ordinator does not necessarily need to have formal biological training, but must understand or be willing to learn the basics of systematic conservation assessment.

Specialist skills required for conservation assessment include high-level analytical GIS skills, conservation planning expertise, and on-the-ground knowledge of the natural history and biogeography of the region. The specialists on the team should include at least one person who has first-hand expert knowledge of the region's ecology.

The team should meet regularly over the course of the project. Ideally all team members should be located in the same city or at least region, to facilitate formal and informal communication.

An advisory group consisting of people who have experience in conservation planning initiatives elsewhere, people with specialist ecological knowledge of the region, and people with knowledge of implementation opportunities and constraints in the region, can provide guidance and credibility, as well as a forum for reporting on progress when significant project milestones are reached.

TECHNIQUES IN CONSERVATION ASSESSMENT (THE TECHNICAL STUFF)

Systematic conservation assessment involves four main tasks:

- developing spatial data layers (for biodiversity features, habitat transformation, future land-use pressures, and existing protected areas);
- setting conservation targets;
- putting it all together to identify options for meeting conservation targets;
- interpreting the results for end-users.

DEVELOPING SPATIAL DATA LAYERS

Mapping Biodiversity Pattern

A map of land classes is an effective way of representing biodiversity pattern. It provides a continuous layer that covers the entire study area. If possible, experts with on-the-ground ecological and biological knowledge should be involved in mapping land classes.

Species distribution data, especially for rare or endangered species, can be used to *supplement* a continuous biodiversity feature layer, but only if a good coverage of species records is available at an appropriate scale.

Mapping Ecological Processes

Mapping ecological processes involves identifying their spatial components. Because much of the literature on ecological processes is spatially inexplicit, this is often a challenge. Defining spatial components of ecological processes involves expert judgement, based on knowledge of the ecology of the region.

Mapping Habitat Transformation

Ideally three categories of habitat need to be identified: irreversibly transformed areas, partially transformed areas that could be restored, and areas where natural habitat remains intact. Mapping partially transformed restorable habitat is not easy and requires careful conceptual planning and trialling.

Mapping Future Land-use Pressures

Mapping future land-use pressures is complex. Keeping timeframes short (five to ten years at most), avoiding complex statistical

models, and drawing on expert knowledge are ways to make the task manageable *and* get a better quality data layer.

SETTING CONSERVATION TARGETS

Targets for land classes should be based on biological heterogeneity, rather than using a flat 10% target. Where appropriate data are available, targets based on species-area relationships within land classes provide reasonable estimates.

Incorporating vulnerability to future land-use pressures in targets for biodiversity features should be avoided. Vulnerability needs to be an independent spatial layer, used to help make choices about where to meet targets in cases where there are options and to schedule conservation action based on competing land uses, but not to set targets.

GUIDELINES ON DATA COLLECTION FOR CONSERVATION ASSESSMENT

Not all spatial data are useful for systematic conservation assessment. The conservation assessment team needs to consider which of the existing data will be useful before spending time and resources on acquiring them.

From a conservation assessment point of view in the regions we have worked in, it makes more sense to invest data collection resources in mapping spatial components of ecological processes, land class boundaries, and transformation (including restorable habitat), than in collecting and curating species distribution data.

INCORPORATING EXPERT KNOWLEDGE

Expert knowledge is crucial for conservation assessment, but must be used within a systematic framework that is data-driven not expert-driven.

PUTTING IT ALL TOGETHER: A MAP OF CONSERVATION OPTIONS

The spatial data layers listed above, together with conservation targets, are building blocks of a systematic conservation assessment. They need to be analysed using conservation planning software to identify priority areas for conservation action. The most frequently used conservation planning software in South Africa is C-Plan together with a GIS.

The strength of C-Plan is that it summarises options for meeting conservation targets and displays them spatially, in an irreplaceability map or *conservation options* map. This is in contrast to software that uses minimum set algorithms to produce a single "black box" spatial configuration that is actually just one of many possible solutions.

FROM CONSERVATION OPTIONS MAP TO END-USER PRODUCT

The spatial results of the conservation assessment need to be interpreted for a wider audience of stakeholders, including land-use planners and decision-makers. Maps of conservation options need to be displayed using biodiversity features rather than planning units, and accompanied with guidelines about land-use management in priority areas. Time and resources should be allocated to this task in the work plan of the conservation assessment team. We still have much to learn about the process of getting from a map of conservation options to an end-user product. We need to explore different methods and capture lessons.

FROM END-USER PRODUCT TO ACTION: MAINSTREAMING BIODIVERSITY PRIORITIES

Mainstreaming is achieved when biodiversity priorities are incorporated into the policies, decisions and actions of a diverse range of people and organisations in various sectors. Even the best maps and guidelines don't sell themselves, so the conservation planning process needs to lay the basis actively for mainstreaming of the conservation planning outcomes. Two ways of helping to achieve this are:

- involving all sectors as equal partners in the conservation planning process;
- ensuring that there is at least one locally based champion who is involved both in the conservation planning initiative and in the subsequent implementation of the strategy and action plan.

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, enabling us to meet and maintain conservation targets that support living landscapes.

1. INTRODUCTION

WHAT WE MEAN BY LIVING LANDSCAPES AND WHY THEY MATTER

The long-term survival and well-being of people depends on effective conservation of the world's biodiversity. 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.

The title of this book is "Planning for Living Landscapes". What do we mean by "living landscapes"?[2] A living landscape is a landscape that supports life of all forms, now and into the future. The term "conservation" is often associated with formal reserves behind fences. While formal reserves 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.

Conservation is relevant to every part of the landscape, from cities to farmers' fields to untouched wilderness areas. It's not just about formal reserves.

"A living landscape is a landscape that supports life of all forms, now and into the future."

Around the world, conservation action has often focused on protecting individual species, usually charismatic ones. However, loss of natural habitat is the single biggest cause of biodiversity loss in South Africa and most of the world. This means that focusing conservation action on reducing habitat loss in ecosystems is often the most effective way of ensuring living landscapes.

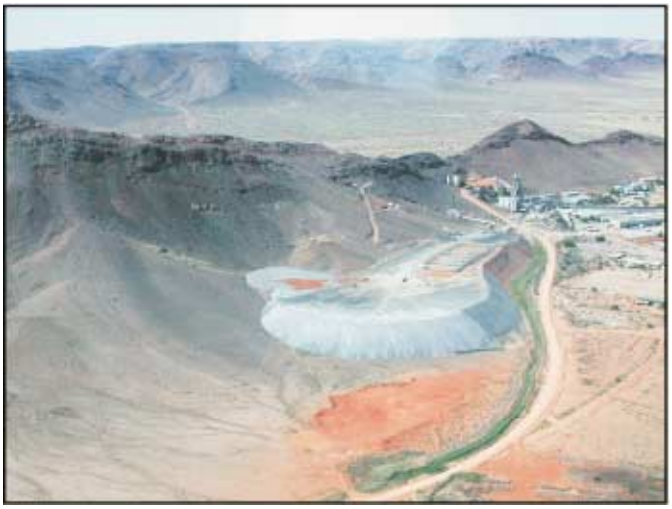
"Loss of natural habitat is the single biggest cause of biodiversity loss in South Africa and most of the world."

The aim of conservation planning is to identify which areas of land and sea are crucial for ensuring a living landscape, and to focus conservation action on these priority areas.[3] 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 – more about this in Chapter 3.

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.

"Conservation planning means planning for living landscapes. It's not just about formal protected areas."

2. The term "living landscapes" has been used elsewhere in relation to conservation planning, including: Pressey, R.L. in prep. *Living landscapes: a guide to locating and designing places for biodiversity*; Steiner, F. 2000. *The living landscape: an ecological approach to landscape planning.* New York: McGraw-Hill.
3. Most conservation plans in South Africa have focused on terrestrial biodiversity. Integrating terrestrial with marine and freshwater conservation assessment is an area in which we have much to learn. The focus in this booklet is thus chiefly on identifying priority areas of land for terrestrial biodiversity conservation. However, many of the principles and lessons can be applied to aquatic conservation planning, and we recognise that it is ideal to integrate planning outcomes for land, sea and freshwater.



Loss of natural habitat, for example as a result of ribbon development along the coast, crop agriculture and mining, is the single biggest cause of biodiversity loss in South Africa and most of the world. Focusing conservation action on reducing habitat loss in priority ecosystems is often a more effective way to conserve biodiversity than focusing on conserving individual species.

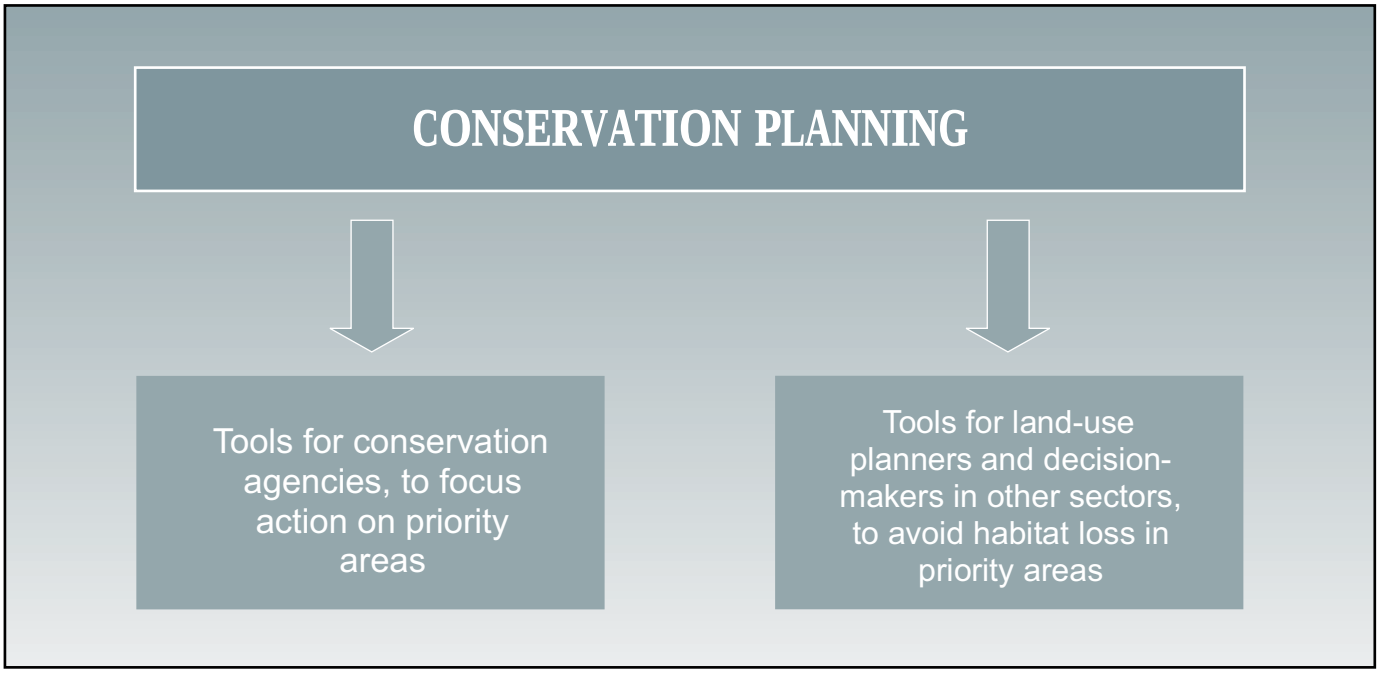


Figure 1: *Conservation planning should inform the work of conservation agencies as well as land-use planning and decision-making in other sectors*

What's in a name?

Planning for living landscapes… conservation planning… bioregional planning… ecoregional planning… Terms to describe planning that focuses on biodiversity conservation abound. We think it's important to avoid getting caught up in long debates about terminology. To avoid confusion, here is a quick look at some of the origins and uses of different terms. In this booklet we use the terms "conservation planning" and "planning for living landscapes" interchangeably.

Ecoregional planning

"Ecoregion" is a term adopted by WWF (the World Wide Fund for Nature), and used widely. WWF has identified 200 priority ecoregions globally.[4] The term ecoregional planning is used by WWF and by The Nature Conservancy to describe planning for biodiversity conservation within an ecoregion.

Bioregional planning

Conservation International uses the term "bioregional planning" to describe biodiversity conservation planning for regions defined using biological criteria.

Within South Africa, the national Department of Environment Affairs and Tourism uses the term in the same way. South Africa's new Biodiversity Act (at the Bill stage at the time of writing) provides for bioregional plans to be endorsed by the Minister of Environment Affairs and Tourism. The Western Cape provincial government uses the term "bioregional planning" to describe a specific methodology and approach based on the United Nations Man and Biosphere programme, which aims to establish biosphere reserves (broad multi-owned, multi-use protected areas).

Conservation planning

We use the term conservation planning to refer to planning at a range of spatial scales that aims to identify priority areas for biodiversity conservation, taking into account patterns of biodiversity and the ecological and evolutionary processes that sustain them. The systematic approach to conservation planning, used widely in South Africa and Australia, is explained in Chapter 2. Conservation planning should also include the development of a strategy and action plan for implementation of planning outcomes – more on this in Chapter 3.

CONSERVATION PLANNING IN SOUTH AFRICA

Over the last 15 years, a wide range of conservation planning exercises has taken place in South Africa, using different approaches. The box on page 6 gives an overview of some of the major developments and turning points in South Africa's conservation planning history. Since the early 1990s the systematic conservation planning approach has been widely applied, with many plans at different scales being conducted. Figure 2 maps the locations of the systematic conservation planning initiatives on which this booklet draws. Some key facts about these projects are summarised below. We will be using some of the projects to illustrate points.

The more recent conservation plans have had the advantage of being able to draw on lessons learned in earlier projects. Our intention in pointing out problems or shortcomings is not to undermine the value of the projects concerned, but rather to ensure that these lessons are available to a wide range of people, not just people who happen to have formal or informal links with those involved.

C.A.P.E. Cape Action Plan for the Environment

Focus: Biome-wide priority setting for the Cape Floristic Region

Scale: 1:250 000

Conservation plan completed 2000. Formed the basis for the Cape Action for People and the Environment (C.A.P.E.) programme.

SKEP Succulent Karoo Ecosystem Plan

Focus: Biome-wide priority setting for the succulent karoo

Scale: 1:250 000

Conservation plan completed 2002. Formed the basis for the Succulent Karoo Ecosystem Programme (SKEP).

STEP Subtropical Thicket Ecosystem Plan

Focus: Biome-wide priority setting for thicket

Scale: 1:250 000

Conservation plan completed 2003. Options for a longer term programme being explored.

4. See Olson, D.M. & Dinerstein, E. 1998. The global 200: A representation approach to conserving the earth's most biologically valuable ecoregions. *Conservation Biology* 12: 502-515.

KZN KwaZulu-Natal provincial conservation plan

Focus: Provincial priority setting

Scale: 1:50 000

Conservation plan completed 2002, taken up directly by the provincial conservation agency.

Agulhas Plain conservation plan

Focus: Fine-scale priority setting for the Agulhas Plain, one of the priority areas identified in CAPE

Scale: 1:10 000

Initial conservation plan completed 2000, subsequently built on through the Agulhas Biodiversity Initiative.

Cape Lowlands Renosterveld conservation plan

Focus: Fine-scale priority setting within critically endangered renosterveld habitat, identified as a priority in CAPE

Scale: 1:50 000

Conservation plan completed 2003, handover to provincial conservation agency underway.

GAENP Greater Addo Elephant National Park conservation plan

Focus: Plan for protected area expansion

Scale: 1:50 000

Conservation plan completed 2002, taken up directly by South African National Parks.

NM MOSS Nelson Mandela Metropolitan Open Space System

Focus: Fine-scale identification of biodiversity priorities to inform the development of a metropolitan open space system

Scale: 1:10 000

Conservation plan completed 2002, taken up directly by the Nelson Mandela Metropolitan Municipality.

All this conservation planning activity in South Africa has had a substantial impact. It has resulted in national and international attention, international donor funding linked to programmes that build on priorities identified in conservation plans, and realignment of budgets within existing conservation agencies and NGOs. Ultimately, these activities will slow the rate of biodiversity loss

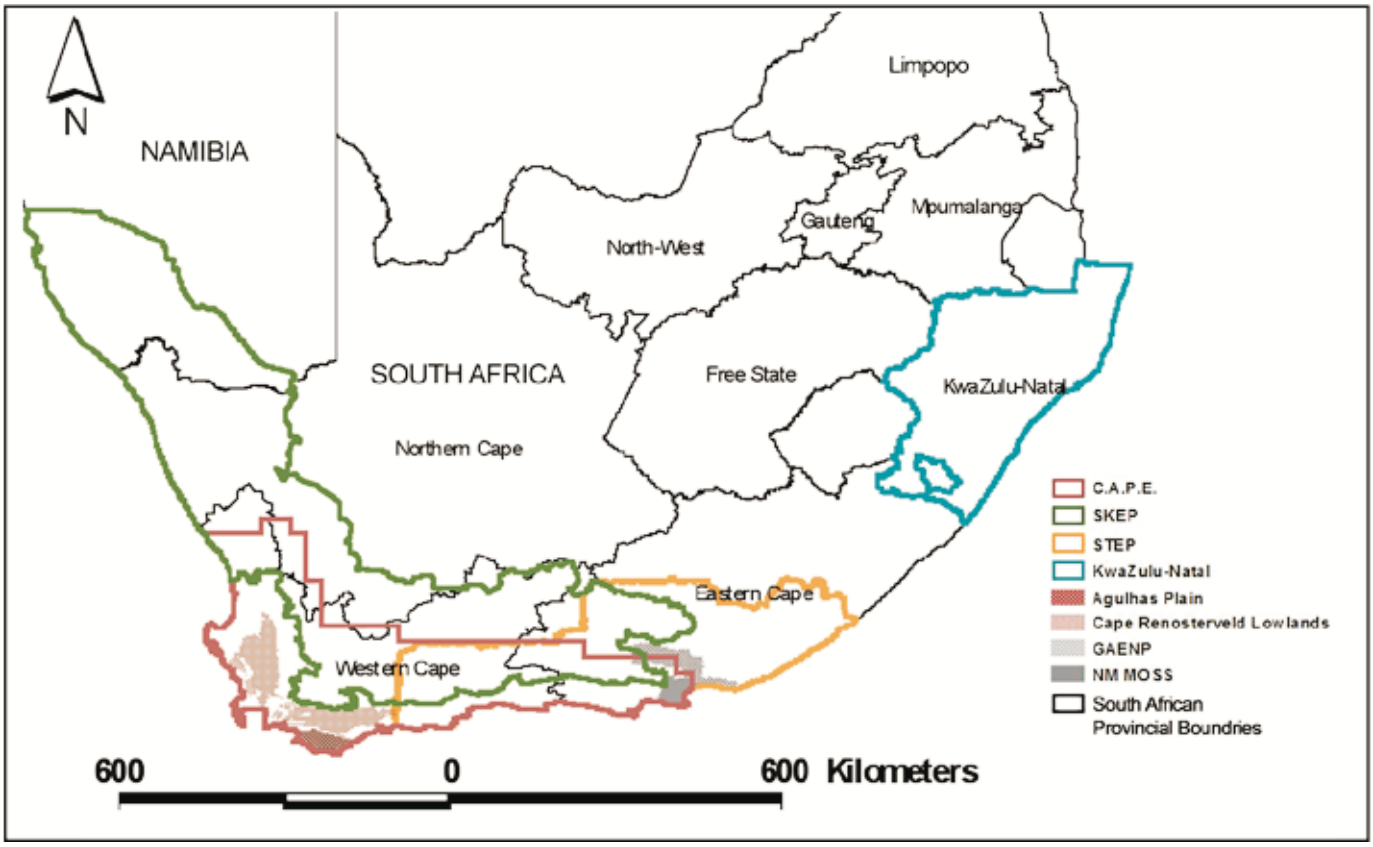


Figure 2: *Systematic conservation plans on which this booklet draws*

by ensuring an increase in the amount of land being afforded some form of conservation management.

Conservation planning provides a way of focusing actions on priority areas – whether on the part of public conservation agencies, local government, NGOs, the private sector, or researchers. Further, we are fortunate in South Africa that the value of integrated development planning and environmental sustainability is recognised, and that we have a system of Integrated Development Plans required by law at the local and district level. This provides us with an important opportunity to link conservation planning with land-use planning and decision-making throughout the landscape, and to encourage biodiversity-friendly land-use practices.

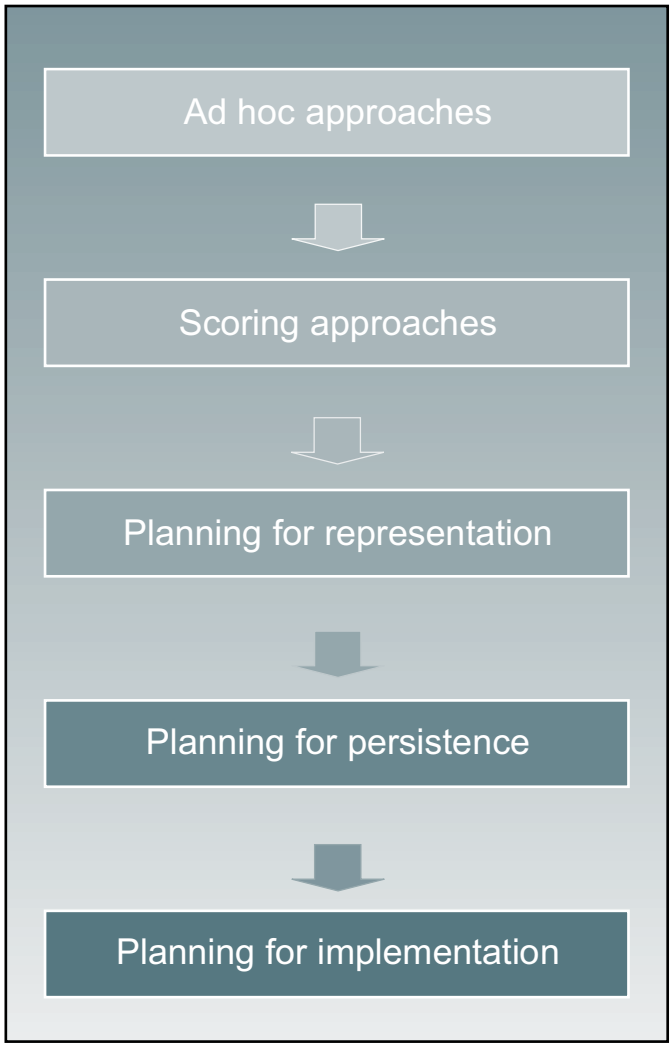


Figure 3: *Internationally and in South Africa, conservation planning has progressed through several phases. Most recently, attention has focused on how conservation planning can lay the basis for effective implementation of the planning outcomes.*

A brief history of conservation planning in South Africa

South Africa has a long history of conservation planning and implementation. Indeed, some of the first protected areas in the world were established here in the late 1800s. The earliest approaches to planning were typically ad hoc and most protected areas were located in landscapes of low economic potential. This resulted in a protected area system that was not representative of the country's biodiversity. Entire ecosystems had fallen through the net and by the time this was appreciated, many had been almost entirely lost.

The first analysis to identify gaps in the protected area system nationally was published in 1974. It drew attention to the biased, unrepresentative nature of the protected area system, but did not lead to conservation action to address the gaps. In the mid-1980s a scoring-based assessment by biodiversity experts of remnant priority sites in the lowlands of the Cape Floristic Region was undertaken, but virtually nothing was done to implement the outcomes. The first research to use reserve selection algorithms to identify a representative system of reserves was conducted in the late 1980s, again in the Cape. The early to mid 1990s saw a spate of algorithm studies where the focus was more on methods of data analysis than on identifying priorities or mechanisms for implementation. Indeed, none of these early assessments resulted in conservation actions.

Then in the late 1990s, dialogue and collaboration with Australian colleagues led to the enthusiastic adoption by South African scientists of the systematic approach to conservation planning. After the advent of a democratic South Africa in 1994, injections of funds from international agencies created exciting opportunities for conservation planning. Systematic conservation plans associated with the C.A.P.E., SKEP and STEP projects (see Figure 2) boosted the capacity for conservation planning and resulted in significant advances in this applied science. Increasingly, our concern is not just with technical and conceptual advances from a purely scientific point of view, but also with "planning for implementation" – making sure that conservation planning lays the basis for effective implementation of the planning outcomes. We pick up on this theme throughout the booklet.

Internationally, conservation planning has gone through several phases in its relatively short life as an applied discipline since the 1970s. Conservation planning in South Africa, too, has progressed through these phases: *ad hoc* approaches, scoring approaches, planning for representation, planning for persistence, and planning for implementation (see Figure 3).

AIMS OF THIS BOOKLET

This booklet is aimed at anyone who is involved in conservation policy, planning or implementation. It is not a formal academic text – scientists are not our primary audience. We have tried to minimise jargon and have not referenced exhaustively (although we have provided some key references for those who want to read further). Anyone who is embarking on a conservation planning project, or who wants to know more about the role that conservation planning can play in guiding conservation action, should find this booklet valuable. It is not a manual for conservation planning, but highlights key issues and considerations for those concerned with doing scientifically sound conservation plans that lay the basis for effective implementation.

2. THE SYSTEMATIC APPROACH TO CONSERVATION PLANNING

STARTING POINTS: REPRESENTATION AND PERSISTENCE

As explained in Chapter 1, the systematic approach to conservation planning has become widely used and accepted in South Africa. 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*.

"Systematic conservation planning recognises the need to conserve biodiversity pattern (a representative sample of all species and habitats) and the ecological and evolutionary processes that allow biodiversity to persist over time."

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 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, or where a politician wanted to declare a hunting area.

This means that, the world over, systems of formal reserves are biased in favour of habitats that have no direct productive value in the market economy – they do not achieve the goal of conserving a representative sample of species and habitats, and they exclude key ecological and evolutionary processes.

"The world over, our protected area systems are biased – they do not conserve a representative sample of biodiversity and they exclude key ecological processes."

Photo: Deon de Villiers

Photo: Aton Pauw

"Biodiversity pattern" refers to all genes, species and habitats

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*. 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

The persistence of biodiversity pattern depends on a complex array of ecological processes, such as the functioning of river corridors and movement of species between uplands and lowlands.

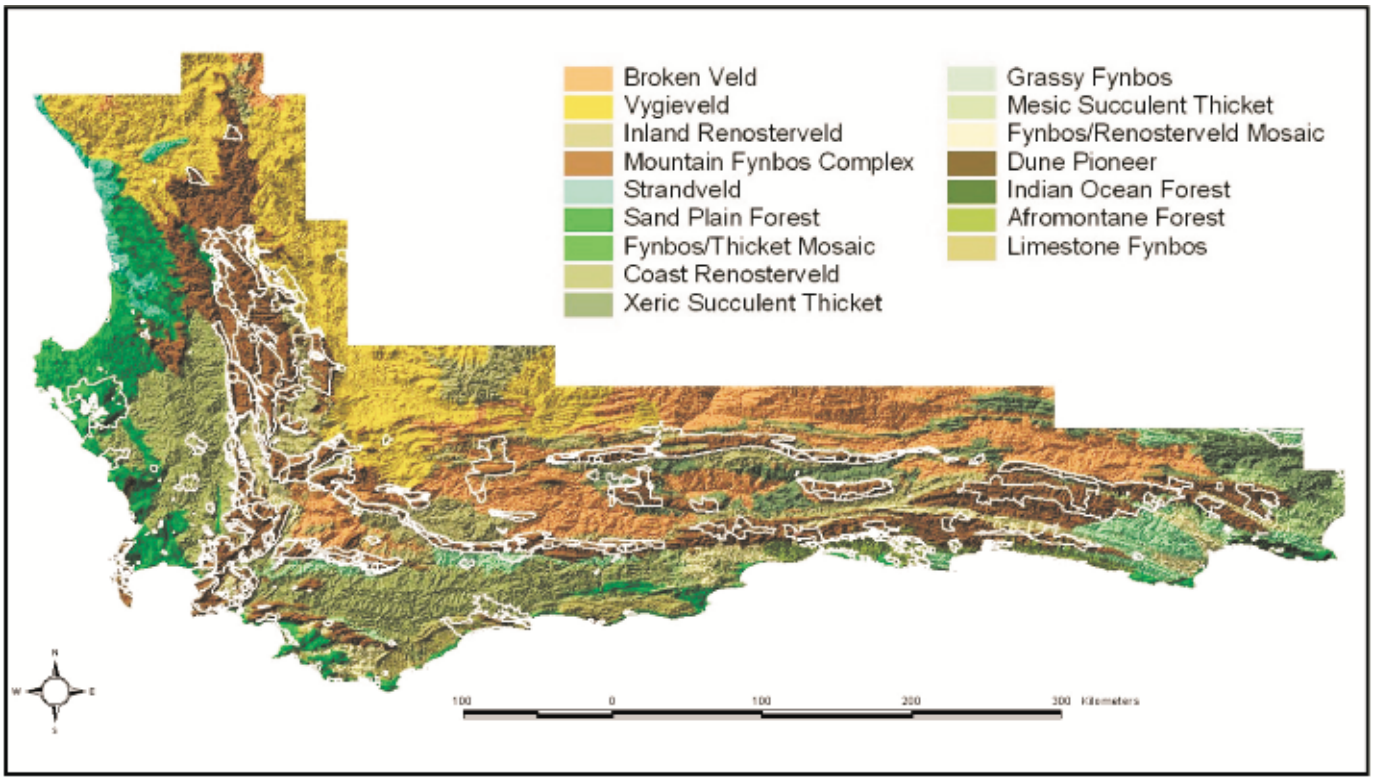


***Figure 4**: Formal protected areas (shown with white outlines) in the Cape Floristic Region, an internationally recognised biodiversity hotspot, are located mainly in mountainous areas, leaving biodiversity in the lowland areas almost completely unprotected. Reserves tend to be relegated to land that nobody wants for other uses.*

of hectares of a river corridor. Conservation targets are quantitative and explicit, and can be set for any biodiversity feature. Targets that meet requirements for representation and persistence are a defining feature of systematic conservation planning, setting the systematic approach apart from other approaches to conservation planning.

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%. In Chapter 5 we discuss how conservation targets can be set more systematically and reliably – how one can use data-driven, scientifically defensible methods to determine how much is enough.

"Data-driven quantitative conservation targets tell us how much we need in order to achieve our goal of a living landscape."

A major lesson from conservation planning in South Africa is that, in order to achieve a living landscape, we usually require some form of conservation management across more than half the landscape. This does not mean that we need formal protected areas to cover half the land. It does mean that we need to manage the land in these areas in a way that is compatible with maintaining ecological functioning, which usually means keeping natural habitat intact. Maintaining ecological functioning is often consistent with biodiversity-based land uses, such as livestock grazing, game farming and ecotourism, if they are sustainably managed.

"The IUCN's 10% target is not enough to ensure a living landscape."

PLANNING AT DIFFERENT SCALES

Spatial planning of all kinds, including systematic conservation planning, can be done at various spatial scales. 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

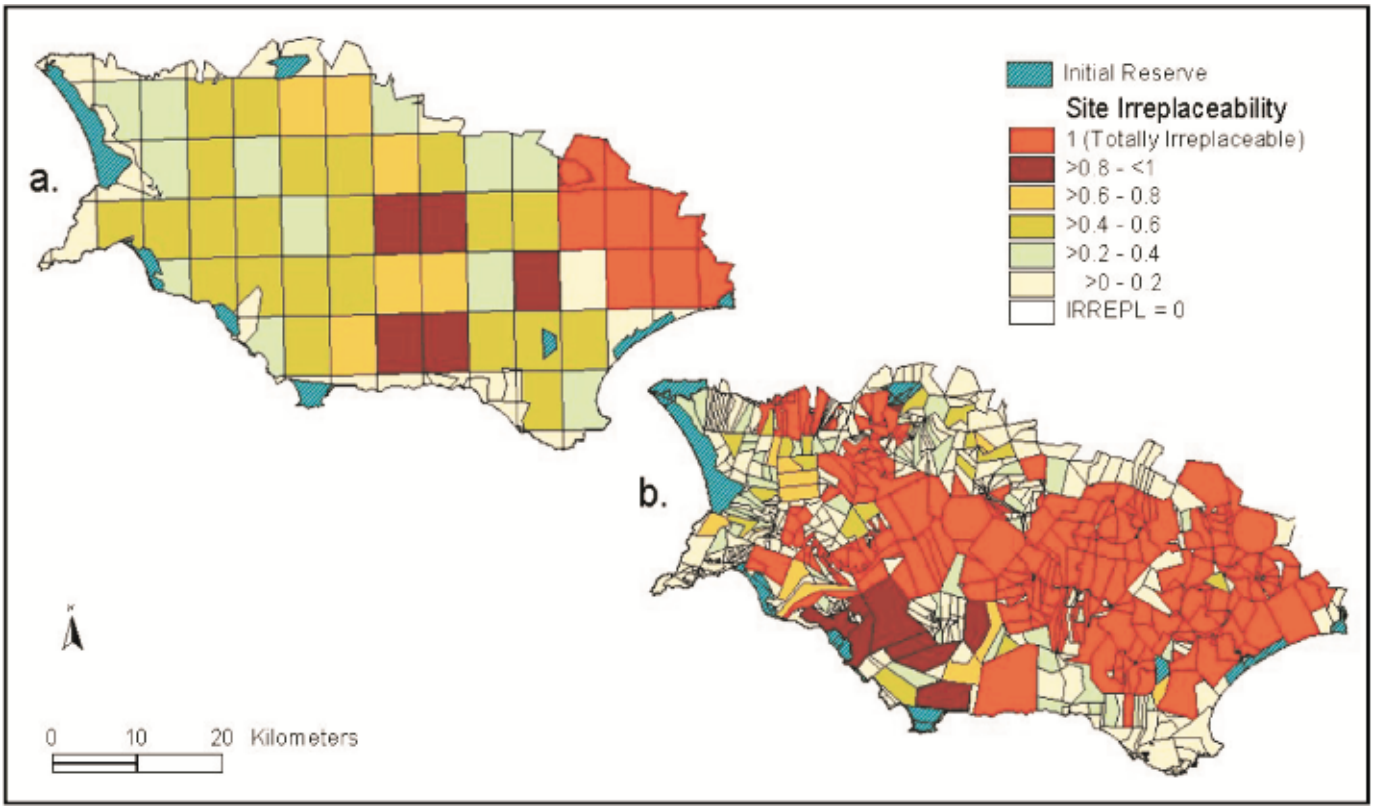


Figure 5: *The Agulhas Plain in the Cape Floristic Region was highlighted as a broad priority area by C.A.P.E, as shown in (a). Fine-scale conservation plan for the Agulhas Plain identified more precisely which areas need to conserved, and also picked up on local-scale priorities that were not identified in the broad-scale plan, as shown in (b).*

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.

In practice, this means that plans at different scales answer different questions and can be applied in different ways. We discuss this further in Chapter 3. For now, we note that 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), 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.

"Broad-scale plans identify broad priority areas for conservation action. Fine-scale plans are needed within these priority areas, giving us a nested system of broad-scale and fine-scale conservation plans that complement each other."

C.A.P.E. provides excellent examples of this. The highest priority areas identified by the C.A.P.E. conservation plan for the Cape Floristic Region were the lowland renosterveld areas in the Overberg and the Swartland, and the Agulhas Plain. Fine-scale plans have subsequently been done in these priority areas (see Figure 2) and are providing guidance for implementation of conservation action.

Now that we have introduced important concepts in systematic conservation planning, Chapter 3 looks at what it takes to do a conservation plan.

3. WHAT DOES IT TAKE TO DO A CONSERVATION PLAN?
SIX INGREDIENTS OF AN OPERATIONAL FRAMEWORK

THINK "IMPLEMENTATION" FROM THE OUTSET, AND ESTABLISH AN OPERATIONAL FRAMEWORK

Conservation planning is not just a technical or academic exercise. A conservation plan is worth little if it does not provide the basis for implementation of conservation action. This link, between planning and implementation, is central to the lessons learned in conservation planning in South Africa. We believe that we have made important advances towards closing the planning-implementation gap.

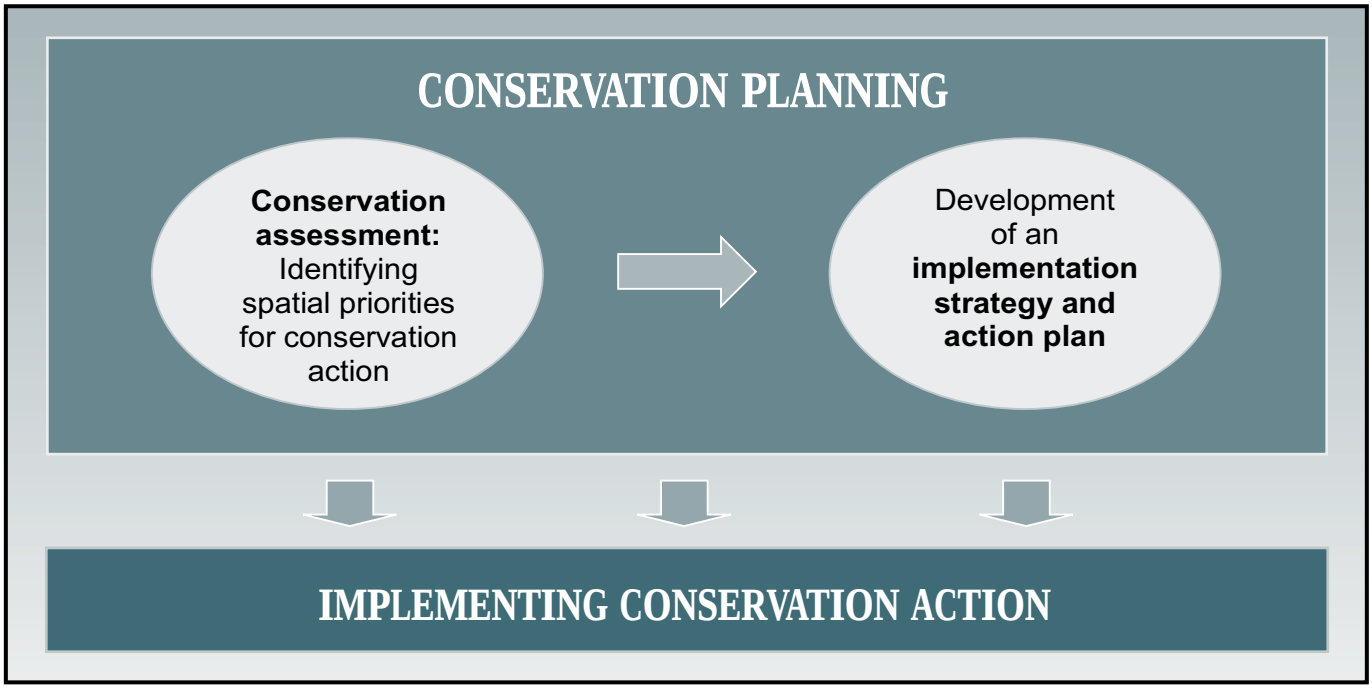
One advance has been to distinguish between *conservation assessment* and *conservation planning*.[5] *Conservation assessment* is the technical exercise of identifying spatial priorities for conservation action. *Conservation planning* includes both conservation assessment *and* the broader process of developing an implementation strategy and a conservation action plan for an area, as illustrated in Figure 6. Conservation assessment is a core component of conservation planning, but there is more to conservation planning than simply conservation assessment. The identification of spatial priority areas through conservation assessment should feed into the development of an implementation strategy and action plan, which may address non-spatial issues such as raising awareness or building capacity in conservation agencies.

"We need stronger links between conservation planning scientists and practitioners in conservation agencies and NGOs, so that we are able to turn knowledge about conservation priorities into effective action on the ground."

However, conservation planning has generally been done by natural scientists, often based in universities or research institutions, whose primary concern has not been the challenges of implementing planning outcomes. A recent review of international conservation planning literature revealed that of about 60 articles published in 2001 and 2002, only about 10% documented either intent to implement the outcomes or that implementation was underway.[6]

We've realised that we need to build stronger links between conservation planning scientists and the practitioners in conservation agencies, NGOs and other organisations whose core business is implementation of conservation action. Otherwise we could end up with more and more sophisticated analytical tools for conservation assessment, that are more and more remote

Figure 6: *Conservation planning should include spatial conservation assessment and the development of an implementation strategy and action plan. Together, these can provide the basis for implementing conservation action. Most existing conservation planning protocols or frameworks focus on providing guidelines only for conservation assessment.*



5. This important distinction is more fully explained in Knight, A.T. & Cowling, R.M. 2003. Conserving South Africa's 'lost' biome. A framework for securing effective conservation planning in the subtropical thicket biome. Terrestrial Ecology Research Unit Report, University of Port Elizabeth (in press).
6. Andrew Knight, Terrestrial Ecology Research Unit, University of Port Elizabeth, pers comm.

from the real world of implementation. As things stand, conservation assessment techniques are not the limiting factor in achieving our goal of living landscapes. The limiting factor is our ability to implement planning outcomes.

The challenge of implementing what we know we need to do is not unique to the conservation sector. Even successful companies often struggle to turn knowledge generated by applied research and management studies into action.[7] So we are not alone in wrestling with this issue.

"We need stronger links between conservation planning scientists and practitioners in conservation agencies and NGOs, so that we are able to turn knowledge about conservation priorities into effective action on the ground."

The formal literature on systematic conservation planning provides protocols for undertaking a conservation assessment, focusing on the technical steps involved such as gathering and analysing data.[8] However, these steps have not, to our knowledge, been placed within a broader systematic conservation planning framework that includes the development of an implementation strategy and action plan.

As a starting point for remedying the lack of attention to implementation, we recommend that any conservation plan be undertaken within a broader operational framework that explicitly addresses implementation of the planning outcomes, and involves relevant agencies and stakeholders in the planning process. How does one do this? There is no single recipe. Different real-world contexts require different planning and implementation approaches. Nevertheless, based on our experience we have identified some key ingredients that are needed for a successful operational framework:

1. Ask "who wants this plan and what is it aimed at achieving?"
2. Pay attention to project design
3. Involve implementing agencies in the conservation assessment team
4. Involve stakeholders in a focused way that addresses their needs and interests
5. Conduct the conservation assessment according to systematic conservation planning principles
6. Interpret the conservation assessment results, and mainstream the conservation planning outcomes

"Successful conservation planning requires an operational framework that addresses implementation of the planning outcomes and involves relevant agencies and stakeholders in the planning process. There is no recipe but there are some key ingredients."

We will discuss each of these key ingredients in turn. Note that the ingredients are not the same as the operational framework itself. Each project will have its own operational framework that will differ according to its particular aims and context. For more reading and examples of operational frameworks for conservation planning, see the STEP, SKEP and Cape Lowlands Renosterveld reports listed on page 54.

The key ingredients discussed in this chapter and the broader lessons discussed in the booklet, deal with conservation planning (represented by the top block in Figure 6), not directly with the longer term implementation of conservation action that should follow (represented by the bottom block). Although these two sets of activities are closely related, it is not useful to conflate them. We are concerned with doing conservation planning in a way that lays the basis for effective implementation. Implementation can take many forms, including long-term multi-sectoral conservation programmes, such as the C.A.P.E and SKEP programmes that are currently underway and that are building on the foundation of the conservation planning initiatives in these regions. We are learning many lessons in South Africa about how to run such programmes effectively; however, they are not the focus of this booklet.

KEY INGREDIENT #1: Ask "Who wants this plan and what is it aimed at achieving?"

If you are involved in a conservation planning project, always start off by asking: Who wants or needs this plan? Who will inherit the planning outcomes and what will they be used for? What is the organisational and institutional capacity for implementation? What are the likely implementation mechanisms? What are the

7. See Pfeffer, J. & Sutton, R.I. 1999. Knowing "what" to do is not enough: turning knowledge into action. *California Management Review* 42: 83–107, for a discussion on the knowing-doing gap in the private sector.

8. For example, see the six steps decribed in the excellent contribution: Margules, C.R. & Pressey, R.L., 2000. Systematic conservation planning. *Nature* 405: 243-253.

implementation opportunities and constraints? If you don't know the answers to these questions, the chances are you have a supply-driven planning exercise on your hands, which is likely to end up sitting on a shelf rather than informing conservation action. This may seem obvious, but it is all too easy for a conservation plan to be driven by academic requirements for journal publications or donor requirements. Researchers, academics and funders have made major contributions to conservation planning practice in South Africa and elsewhere, and should continue to be involved; indeed, ongoing academic research on techniques for conservation assessment are essential for improving and refining ways of identifying priority areas. However, planning for implementation requires that the starting point for a conservation planning initiative is the needs of the implementing agencies rather than the needs of researchers or those funding the initiative.

There may be cases in which the need for a systematic conservation plan has not been clearly identified or recognised by a conservation implementing agency, but in which such as plan could add enormous value by contributing strategic direction and focus to the agency's work. In such instances, conservation planners need to make an effective case for systematic conservation planning, illustrating how it would address real needs of the implementing agency. This requires sensitivity to the implementation challenges and capacity constraints faced by the agency, and may require capacity building in the agency as part of the conservation planning initiative.

In the quest for demand-led conservation plans that meet real implementation needs, we should not drive an artificial wedge between research and practice. A conservation plan that is demand-led can provide valuable opportunities for furthering the applied discipline of conservation planning. The issue here is not "science vs implementation" but rather the need to strengthen the link between the two, and to encourage research that provides insights into implementation successes and failures.

"A conservation plan should be demand-led not supply-driven. Make sure that the aims of the conservation plan are clear."

It is important to know what need the plan is intended to meet, and to be sure that the plan will indeed be able to meet this need.

Systematic conservation plans can be done at different scales (as we mentioned at the end of Chapter 2), and in different ways. Not all plans are appropriate for all uses. The box below gives some examples of possible aims of conservation plans, highlighting the different aims of broad-scale and fine-scale plans. The intended aims of a conservation plan will depend not only on scale, but also on who is commissioning the plan and who will inherit the planning outcomes.

Possible aims of a conservation plan

Examples of appropriate aims of a broad-scale conservation plan:

- identify broad scale geographic priorities for guiding donor investment;
- identify broad scale geographic priorities for guiding the focus of provincial and national conservation agencies;
- identify broad priority areas that require further fine-scale planning to design protected area networks;
- provide a regional context for decisions about individual parcels of land;
- identify ecosystem conservation status to red-flag threatened ecosystems in land use decision making.

Examples of appropriate aims of a fine-scale conservation plan:

- design a new protected area, with the emphasis on land purchase as an implementing mechanism (meeting conservation targets will be constrained by the need to identify contiguous areas);
- design the expansion of an existing protected area, either through land purchase or through contracting private or communal landowners into the protected area network;
- identify priority areas for voluntary off-reserve conservation schemes in highly fragmented landscapes;
- guide land-use management and decision-making for specific parcels of land outside protected area networks.

KEY INGREDIENT #2: Pay attention to project design

There are *many* different ways to design a conservation planning project, and as we have said, there is no recipe. Project design will be influenced by many factors, including the aims of the conservation plan, the local organisational and institutional context, and the available budget. The lesson is thus simply to pay attention to project design. This means investing time and resources in planning all aspects of the project. Project design in the conservation planning context includes:

- designing inter-related project components, one of which should be a conservation assessment component;
- establishing a conservation assessment team (see Chapter 4), and teams for other components that have been identified;
- establishing a project advisory group or steering committee;
- designing mechanisms to involve implementing agencies and other stakeholders in the planning process, often with the aim of building the basis for implementation;
- establishing timeframes and setting up project management systems.

In most cases project design should involve a consultative process with key stakeholders. For example, the SKEP planning phase was initiated with a broad consultative workshop at which four components were identified, and four sub-regions within the planning area were delineated. The project set-up process took approximately three months and involved about 30 people in workshops and discussions. This investment in project design laid the basis for extensive stakeholder involvement throughout the conservation planning process. A consultative project design process could also take the form of focused one-on-one meetings with key stakeholders.

"Invest time and resources in consultative project design."

Note that a consultative project design process does not remove the need for a lead organisation to drive the initiative and take final responsibility for designing and establishing the project.

KEY INGREDIENT #3: Involve implementing agencies in the conservation assessment team

What do we mean by an implementing agency? Often the appropriate lead implementing agency for a conservation plan is a public sector conservation agency, such as a provincial or national conservation agency. The core business of these organisations is conservation. However, depending on the aim of the conservation plan, implementing agencies could include municipalities, NGOs, community-based organisations, even private companies (for example if the aim of the conservation plan is to establish a multi-owned protected area), or a combination of these working in partnership.

We cannot stress enough the need for conservation implementing agencies either to lead or to be closely involved in the conservation planning process. This involvement can take different forms. Ideally, the implementing agency that will inherit the outcomes of the conservation plan should be involved directly in undertaking the conservation assessment, with a staff member of the implementing agency involved in the day-to-day work of the conservation assessment team.

Implementing agencies need to be closely involved in the conservation planning process, ideally as part of the conservation assessment team.

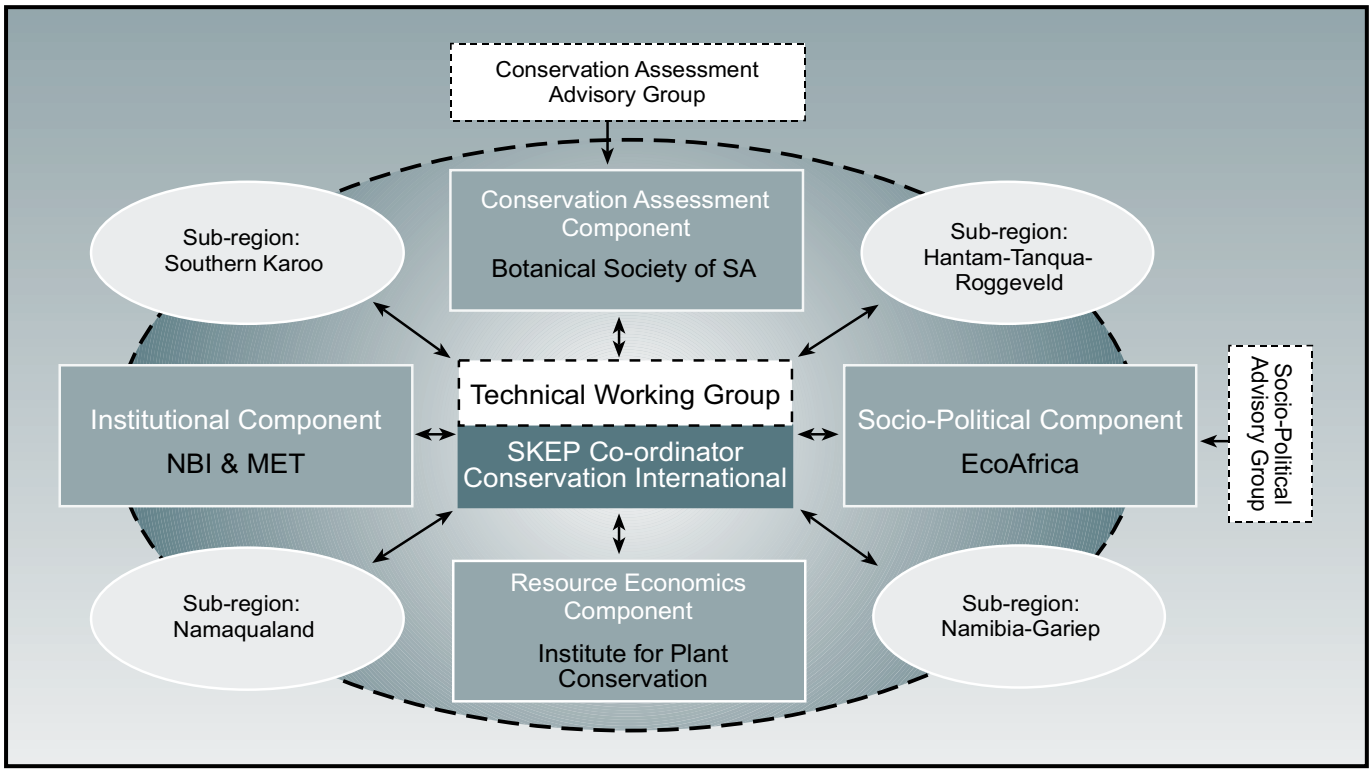


Figure 7: *Different conservation planning initiatives have different project designs. The SKEP project design process established four components, each of which was led by a different local organisation or institution, with Conservation International's Southern Africa Hotspots Program playing an overall co-ordinating role.*

If it is not possible to involve the implementing agency directly in the conservation assessment team, then it is crucial for key people in the implementing agency to be involved in other components of the conservation plan, or to be kept fully in touch with the initiative, for example through regular update sessions. The implementing agency is not simply another stakeholder.

"Implementing agencies need to be closely involved in the planning process, ideally as part of the conservation assessment team."

A good example of success in this regard comes from South Africa's KwaZulu-Natal province, where a senior scientist in the provincial conservation agency, Ezemvelo KwaZulu-Natal Wildlife, was directly involved in spearheading a systematic conservation plan for the province, working with a conservation assessment team that included other agency staff and outside conservation planning specialists. This meant that the conservation plan met agency needs and informed its ongoing work, without a time-consuming and complex handover of the plan from the conservation assessment team to the implementing agency. The plan was effectively mainstreamed in the agency, and helped to define the agency's priority actions.

KEY INGREDIENT #4: Involve stakeholders in a focused way that addresses their needs and interests

The need to involve a broad range of stakeholders in a planning process is not a new insight, especially in South Africa where we have a culture of participatory approaches and considerable experience with them.

In this context, the lesson for conservation planning is: involve a broad range of stakeholders from different sectors in the conservation planning process, but do this in a focused way. A great deal of time and resources can be wasted on poorly conceived, unfocused stakeholder involvement programmes.

The topic of stakeholder involvement could easily fill a whole booklet on its own, so our intention here is not to be exhaustive. Instead we would like to highlight selected pointers for achieving focused stakeholder involvement in a conservation plan. The following lessons should result in extra mileage from stakeholder participation in the planning process.

Photographer unknown

Photo: Adrian Simmers

Photo: Colin Paterson Jones

A powerful way to make the case for biodiversity is to give examples of how biodiversity contributes to livelihoods and to goods and services in a region.

- When dealing with other sectors, make the case for biodiversity. Biodiversity specialists often fail to be explicit about why biodiversity matters and how it contributes or could contribute to the local or regional socio-economy.
- Identify key stakeholders up front and understand their needs.
- Based on these needs and the project's ability to meet them (or not), design a participation programme with clear objectives.
- Avoid holding broad participatory workshops for the sake of it. Focused interactions are often more effective.

A note on language

In dealing with stakeholders from sectors other than conservation it is important to be conscious of the language we use. Biodiversity specialists often use the term "threat" to describe various pressures on biodiversity, often lumping together agriculture, urban development, industrial development, mining, illegal collection, overharvesting, and climate change as "threats" to biodiversity. While climate change and illegal collection of plants and animals are indeed threats to biodiversity, land uses such as agriculture and mining are legitimate economic activities that make a valuable contribution to our society. To label them "threats" is not helpful when dealing with stakeholders from multiple sectors, particularly if we are trying to involve them in conservation action. Rather refer to land-use pressures. We need to be working with these sectors to ensure that their activities, as far as possible, do not result in further habitat loss in priority areas for biodiversity conservation.

"Avoid the term 'threats' to describe legitimate land uses other than conservation. Rather refer to land-use pressures."

Make the case for biodiversity

Biodiversity specialists often fail to be explicit about why biodiversity matters and how it contributes or could contribute to the local or regional socio-economy. Yet this is possibly the most important message to get across to stakeholders in a range of sectors. Making the case for biodiversity needs to be an integral part of the stakeholder engagement strategy. Almost all workshops or meetings with stakeholders from sectors other than conservation provide an ideal opportunity to address the "so what" question

briefly but powerfully, explaining why we should bother to do conservation planning in the first place.

Ideally the case for biodiversity should be context specific – it should relate to the area for which the conservation plan is being done. For example, in the succulent karoo the value of biodiversity lies partly in providing sustainable grazing, which is the basis for many livelihoods in the region, and in protecting soil and water resources. In the subtropical thicket biome, biodiversity provides the basis for the economic value of game-based tourism, hunting and carbon sequestration. In the Cape Floristic Region, intact montane ecosystems are crucial for maximizing the production of water for thirsty lowlands, whereas lowland remnants are a sanctuary for insects that pollinate economically important fruit orchards and harbour rare plants that may have commercial horticultural potential.

"Make the case for biodiversity with context-specific examples of how biodiversity contributes to the local or regional economy."

A major advance in thinking is that we need to see conservation *as* a land use, rather than as something that prevents land from being used. In other words, conservation is not something that we do instead of using the land. Conservation is a productive land use in the same way that, for example, crop agriculture or residential development are productive land uses. A recent estimate put the direct and indirect value derived from the Cape Floristic Region's terrestrial ecosystem goods and services at $1,100 million per year.[9] Biodiversity conservation is central to maintaining this flow of valuable ecosystem goods and services.

"We need to see conservation as a productive land use, not as something that replaces productive use of the land."

Identify key stakeholders up front

An early task in a conservation planning initiative is to identify stakeholders. The specific aims of the conservation plan will determine who the relevant stakeholders are. A stakeholder analysis should include identification of the needs and interests of stakeholders, their geographic scope, and obstacles and constraints to their participation such as transport, time or other resources. Stakeholders include ground-level stakeholders such as local communities (both those that own land and those that are landless), as well as high-level stakeholders such as national government departments and provincial politicians. Stakeholders may be identified because they are relevant, important or influential.

Design a participation programme with clear objectives

Next comes the task of designing a programme for stakeholder involvement. It is important to clarify objectives of stakeholder participation in the conservation planning process. These objectives could include:

- building awareness of the conservation planning initiative;
- gathering information to feed into the conservation plan;
- building consensus on a conservation vision for the region concerned;
- building consensus on priority conservation actions;
- getting commitment from stakeholders to be involved in implementing conservation actions identified in the plan;
- building human and institutional capacity to implement the planning outcomes.

"Objectives of stakeholder participation in a conservation plan could include building awareness, gathering information, building consensus on a vision and priority actions, building capacity and establishing institutions to implement the planning outcomes."

Different stakeholders need to be involved in different aspects of the conservation planning process, and require different levels of detail with respect to the technical conservation assessment component of the plan.

Some stakeholders need to be involved in the consultative project design process discussed above. It is important to include key high-level stakeholders in this process – people whose support for the project, or lack of it, could make or break it, whether or not they will be directly involved in day-to-day implementation of the results. Also include all implementing agencies, and key experts with specialised ecological or socio-economic knowledge of the whole region.

9. Turpie, J.K., Heydenrych, B.J. & Lamberth, S.J. 2003. Economic value of terrestrial and marine biodiversity in the Cape Floristic Region: implications for defining effective and socially optimal conservation strategies. *Biological Conservation* 112: 223-251.

It is important to be clear about the objectives of stakeholder involvement in a conservation planning initiative. Different objectives might be awareness raising, information gathering, and building consensus on a conservation vision and action plan.

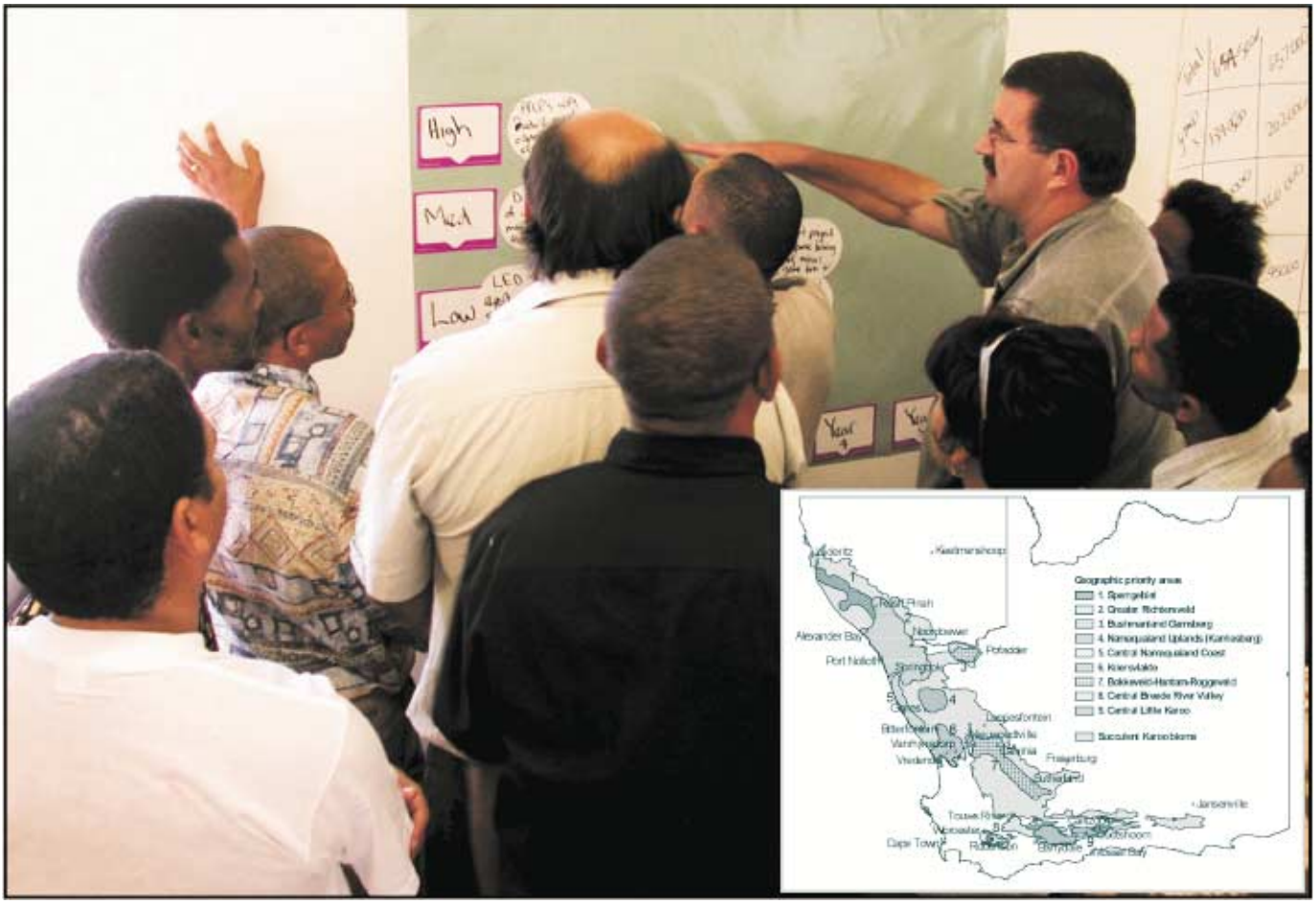
Some stakeholders need to involved in the conservation assessment component of the conservation plan. These include the scientific community and expert stakeholders (people with in-depth ecological or socio-economic knowledge of different parts of the region being planned for). One way to involve experts in the conservation assessment component is to invite them to a workshop early in the project to get input on the approach and, for example, possible sources of data. It can also be useful to report draft results of the conservation assessment to a forum of scientists with expertise in the region concerned.

Other stakeholders are crucial for the development of an implementation strategy and action plan. These are likely to include stakeholders from a range of social and economic sectors in the region, such as local government, agriculture, tourism, and specific community groups. It is important for them to be involved in action planning and in committing themselves to conservation action in geographic priority areas identified by the conservation assessment exercise. For these stakeholders, detailed information about the technical aspects of the conservation assessment exercise is often not necessary or constructive. While everyone involved should understand the basics of the systematic conservation planning approach, the precise methodological details of a particular conservation assessment exercise are less relevant for most stakeholders.

In dealing with all stakeholders, it is important to communicate the objectives of the conservation plan and the objectives of the stakeholder participation process clearly, to avoid unrealistic expectations. For example, scientists may have unrealistic expectations that resources will be available to update and improve databases on particular plant or animal groups, or municipal and provincial officials may have expectations that a broad-scale conservation plan will provide all the biodiversity information needed for decision-making at the individual property level.

Avoid holding broad participatory workshops for the sake of it

How much participation is enough and what form should participation take? A centralised planning process with little participation is not appropriate in most cases; but it's also possible to swamp a conservation plan with too much process. There is



SKEP's decentralised action planning workshops took place in each of the nine broad priority areas identified in the conservation assessment (shown on the map), and involved stakeholders from multiple sectors. The workshops were professionally facilitated and focused on identifying priority conservation actions, including timeframes, budgets and lead organisations.

a need to balance inclusiveness and stakeholder involvement with action and delivery.

One way to achieve this balance is to use different mechanisms to interact with different stakeholders. As we've said, different stakeholders have different needs and different interests in a conservation planning initiative. While broad workshops may be an efficient way to achieve some objectives of participation, such as raising awareness of the conservation planning initiative at the beginning, and reporting results and building consensus on priority actions at the end, there are many cases in which broad workshops simply lead to workshop fatigue, resentment and frustration. Often more effective than broad stakeholder workshops are focused one-on-one meetings or small group meetings with particular stakeholders to address particular issues directly related to their needs or inputs into the planning process. Geographically decentralised workshops can also be useful for a broad-scale plan that covers a large geographic area.

When broad stakeholder workshops *are* held, impeccable workshop planning and facilitation are crucial. Professional assistance with workshop facilitation is often warranted.

"Broad unfocused participation leads to workshop fatigue and stakeholder frustration."

If stakeholders participate in a long drawn-out planning process, momentum and credibility can be lost, particularly if there is a delay between planning and implementation. In C.A.P.E., many local-level people were involved in a long planning process over two years, and then there was a substantial delay before implementation got under way. This resulted in loss of momentum for a period. The lesson from this is that one has to be careful about involving local stakeholders in an exercise that is all about planning. People on the ground deal with practical realities of

ongoing habitat loss and are understandably frustrated when planning takes up large amounts of time and resources and has no perceived link to action.

KEY INGREDIENT #5: Conduct the conservation assessment according to systematic conservation planning principles

As we've seen in the preceding discussion, conservation assessment is just one component of conservation planning. Nevertheless, the importance of this conservation assessment exercise should not be underestimated. It provides a defensible identification of geographic priority areas for conservation action.

Systematic conservation planning has the advantage of being data-driven, target-driven, transparent and defensible. We have found that stakeholders from sectors other than conservation respond well to the concept of conservation targets, a cornerstone of the systematic approach. In all sectors of the socio-economy, people set targets for their businesses, organisations and personal lives. Targets are easy to relate to. 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.

"Stick to systematic conservation planning principles in conducting the conservation assessment. They help to provide a basis for constructive interaction with other socio-economic sectors."

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. Stakeholders 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.

KEY INGREDIENT #6: Interpret the conservation assessment results, and mainstream the conservation planning outcomes

Two major lessons that have emerged from conservation planning initiatives in South Africa are as follows:

- Interpret the conservation assessment results: The spatial results of the conservation assessment need to be *interpreted* for implementing agencies and a wider audience of stakeholders. The results of a conservation assessment in their raw form are not always meaningful to people who are not conservation planners!
- Mainstream the conservation planning outcomes: The outcomes of the conservation plan, including spatial priorities and an implementation strategy and action plan, need to be actively mainstreamed. By mainstreaming we mean embedding the results of the conservation plan in the policies and day-to-day work and activities of people and organisations in a range of sectors, including conservation agencies, local government, tourism, agriculture and mining. If these sectors integrate priority areas and actions for biodiversity conservation into their frame of reference for making decisions, our goal of living landscapes becomes achievable.

These two lessons are so important that we have devoted a chapter to each. Chapter 6 deals with interpreting the spatial results of a systematic conservation assessment to provide meaningful products for a broad range of sectors involved in making decisions about using and managing land. Interpretation of conservation assessment results needs to be built into the conservation assessment process. This means allocating resources and time to these activities in the work plan.

"Build interpretation of the conservation assessment results into the work plan of the conservation assessment team."

Chapter 7 deals with how to use the conservation planning process to lay the basis for effective mainstreaming of the biodiversity priorities identified in the plan. Mainstreaming the outcomes of a conservation plan is not a once-off activity. It should start in the conservation planning phase and continue into the implementation phase, with the implementing agency playing a leading role.

"Use the conservation planning phase to lay the basis for mainstreaming the biodiversity priorities identified in the plan."

4. THE CONSERVATION ASSESSMENT TEAM

In this chapter we address the question of who needs to be part of the team that undertakes the conservation assessment component of a conservation plan, and some aspects of the team's functioning. Remember that conservation assessment needs to be embedded within an operational framework that includes the development of an implementation strategy and action plan.

The design of a conservation planning project differs from project to project, depending on the spatial scale of the conservation plan and its aims, the institutional and socio-political context of the region, and the timeframe and budget. Figure 7 in Chapter 3 shows one example of different components of a conservation planning project. In all projects there is likely to be a conservation assessment team – a team of people who assess the state of biodiversity in the region, set conservation targets and identify spatial options for meeting those targets (more about this in Chapter 5). The conservation assessment team should have close links and regular communication with other components of the conservation planning initiative, such as those dealing with socio-political or institutional aspects. The role of an overall co-ordinator to link and integrate the work of the different components is crucial.

It isn't always possible to predict how well members of a team will work together, but there are some key lessons to consider when assembling and managing a conservation assessment team that will enhance its performance.

ASSEMBLING THE TEAM

As a starting point we assume that a single organisation is tasked with leading the conservation assessment component of the conservation planning initiative. This could be the same organisation that is co-ordinating the overall conservation planning initiative, but does not have to be. This organisation will assemble the conservation assessment team and manage the conservation assessment budget.

Conducting a conservation assessment requires co-ordination skills, specialist expertise, and a group of advisors. In all cases the team should include at least one person who has good on-the-ground knowledge of the natural history and biogeography of the region for which the assessment is being done. Our experience is that expert knowledge of this kind is invaluable in conservation assessments. Not all members of the team need to be employed full-time or even part-time within the organisation that is leading the conservation assessment. The team can be made of people contracted to work full-time or part-time on the project while still based in other organisations, as long as there is effective co-ordination. If the conservation planning initiative is being led by an organisation other than the implementing agency, special effort should be made to involve a person from the agency on the conservation assessment team as well as on the advisory body.

"Conducting a conservation assessment requires co-ordination skills, specialist skills, and a group of advisors."

The size of the team will depend on the project budget and timeframe, and the available skills in the region. In rare cases one person may have the skills to do the entire assessment in the time available; in most cases several people will be needed to make up the required skills and meet project deadlines. When budgets and timeframes are more than usually tight, it is important to have at least some highly experienced team members who can draw directly on lessons learned from other conservation planning initiatives.

Below we look briefly at the role of conservation assessment co-ordinator, the specialist skills required, and aspects of the team's management.

THE CONSERVATION ASSESSMENT CO-ORDINATOR

Regardless of the project budget, investment in project co-ordination is critical. In complex GIS-based conservation assessments where large amounts of information have to be gathered, generated, and assessed, it is easy for delays, duplication and mistakes to happen. Good co-ordination greatly reduces the likelihood of these mishaps and increases efficiency. In addition, co-ordination is needed to interact effectively with the advisory group and with stakeholders in the conservation assessment

process. In a low-budget, rapid conservation assessment, it is appropriate for the co-ordination function to absorb proportionately more of the budget than in a high-end well-resourced conservation assessment. In either case it works best to have a dedicated co-ordinator rather than to have one person attempting to fulfil co-ordination functions combined with some of the specialist functions discussed below.

An experienced co-ordinator does not necessarily need to have a biodiversity background or formal training in conservation planning. It is more important to have a co-ordinator with project management skills than to have someone who understands the technical ins and outs of conservation assessment. However, the person does need to have, or to develop, an understanding of the conservation planning process and the basics of systematic conservation assessment.

"Investment in project co-ordination is critical, regardless of the project budget. The conservation assessment co-ordinator does not necessarily need to have formal biological training, but must understand or be willing to learn the basic principles of systematic conservation assessment."

Roles of the co-ordinator include:

- ensuring that a quality conservation assessment is produced within the timeframe and budget allocated, through effective management of the conservation assessment team and effective involvement of the advisory group;
- ensuring that each team member has a clear work plan, and that the work is co-ordinated between team members;
- holding regular team meetings and advisory group meetings;
- gathering data sets required for the conservation assessment;
- ensuring that the conservation assessment component is integrated with the other components of the conservation planning initiative;
- providing the primary point of contact with stakeholders who are involved in the conservation assessment component (for example, scientists and experts), and managing stakeholder interactions on behalf of the team;
- organising stakeholder workshops and meetings that form part of the conservation assessment component;
- ensuring that stakeholders involved in the rest of the conservation planning initiative receive accurate, clearly interpreted information about the conservation assessment process and results.

The conservation assessment co-ordinator should have a close working relationship with the overall co-ordinator of the conservation planning project, and with co-ordinators of other components if these exist, for example through regular co-ordination meetings.

SPECIALIST CONSERVATION ASSESSMENT SKILLS

Conservation assessment is transdisciplinary, so a team of specialists with different skills is required. The particular skills required will depend partly on the aims of the conservation planning initiative. However, there are some specialist skills that are always needed:

- high-level analytical GIS skills;
- conservation planning expertise;
- on-the-ground knowledge of the natural history and biogeography of the region.

The role of specialists with socio-economic skills depends on the scale and the aims of the plan. If the assessment is for a fine-scale conservation plan aimed at establishing or expanding a protected area, specialist socio-economic skills may be required in the form of a team member who understands the specific socio-economic issues and challenges of the region and can think spatially about these. In a broad-scale conservation assessment, the generalised scale means that socio-economic issues can usually be addressed through focused consultation with a few well-chosen experts rather than requiring this expertise to be resident in the conservation assessment team.

We have found that the limiting set of skills in conservation assessment is highly specialised GIS and conservation planning skills *coupled* with ecological understanding of the region. If it is not possible to find team members who embody more than one of the specialist skills required, then separate people with these different skills need to be brought into the team, with extra care taken to co-ordinate their work.

At least one member of the conservation assessment team needs to have first-hand expert knowledge of the region's ecology

Conservation assessment requires high-level GIS skills and conservation planning expertise, both of which need to be further developed in South Africa

As far as possible the specialists on the team should be free to focus on their highly specialised work and not be expected to fulfil co-ordination functions.

"Specialist skills needed for a conservation assessment include: high-level analytical GIS skills, conservation planning expertise, and ecological knowledge of the region."

Different members of the team can deal with different data layers needed for the conservation assessment (see Chapter 5). For example, one specialist (or team of specialists) can map biodiversity features, while another deals with habitat transformation, and a third with future land-use pressures. But the bigger the team, the more difficult to manage and co-ordinate without problems, so it is useful to have specialists who combine skills for more than one technical aspect or data layer.

The team may also need to include a GIS technician to assist the GIS specialist(s) with routine analyses and data management.

INVOLVING THE IMPLEMENTING AGENCY

While it may sometimes seem easier to work with a small specialist team, involving at least one person from the implementing agency in the conservation assessment team is important for closing the planning-implementation gap, and can build the capacity of the implementation agency in conservation assessment and conservation planning. The KwaZulu-Natal provincial conservation plan provides us with an excellent example of where this approach has been used. However, involvement of the implementing agency in the conservation assessment team has tended to be neglected in other conservation planning initiatives and needs more attention. We need to test different ways of involving the implementing agency, and capture and share lessons.

AN ADVISORY GROUP

An advisory group can play an important role in providing strategic guidance, endorsing decisions made by the conservation assessment team, and giving credibility to the conservation assessment results. It could include people who have experience in conservation planning initiatives elsewhere, people with specialist ecological knowledge of the region, and people with knowledge of implementation opportunities and constraints in the region (including at least one person from the implementing agency). It should also include the person who is co-ordinating the overall conservation planning initiative.

"An advisory group can provide guidance and credibility, as well as a forum for reporting on progress when significant project milestones are reached."

The advisory group should meet periodically throughout the project. It is useful to set the meeting dates well in advance, and have them coincide with milestones in the conservation assessment.

For the conservation assessment team, advisory group meetings provide a forum for obtaining consensus on approaches and outcomes, reporting on progress and making sure that the conservation assessment is on track.

MANAGING THE TEAM

Once the conservation assessment team is assembled, it is important to involve the team members in the development of a detailed workplan for the conservation assessment component. This establishes at the outset a clear understanding of the project milestones and how the conservation assessment component relates to other components of the conservation plan. A great deal of time can be wasted due to lack of communication amongst team members at the outset.

The team should meet regularly throughout the project life. For example, the SKEP conservation assessment team met every two weeks, with more frequent one-on-one meetings between team members in between. The closer the team members geographically the easier this is to do. Teams with different members based in different parts of the country can become difficult to manage, as formal and informal interaction is generally less frequent than if everyone was in the same city. In STEP, separate teams of specialists based in different parts of the country worked on mapping vegetation and mapping transformation, and did not attend overall co-ordination meetings for the conservation planning initiative. This led to problems and delays later in the project, because of incompatible spatial data layers. If there is no way around having different team members based in different places, extra careful co-ordination is required.

In the next chapter we discuss lessons to do with conservation assessment techniques. These lessons are relevant especially for members of a conservation assessment team.

5. CONSERVATION ASSESSMENT TECHNIQUES (THE TECHNICAL STUFF)

As we've seen, conservation assessment is just one component of conservation planning, which also needs to involve the development of an implementation strategy and action plan. Nevertheless, conservation assessment is a core activity in any conservation planning initiative, and one in which significant advances have been made in South Africa.

Conservation assessment is a rapidly growing field, with new developments in analytical approaches and software occurring all the time. Our aim here is not to delve into issues that are as yet largely unresolved or questions that are still in the early stages of being explored. Instead, we draw out some substantive lessons that are likely to apply across a wide range of planning regions and ecological and socio-economic contexts.

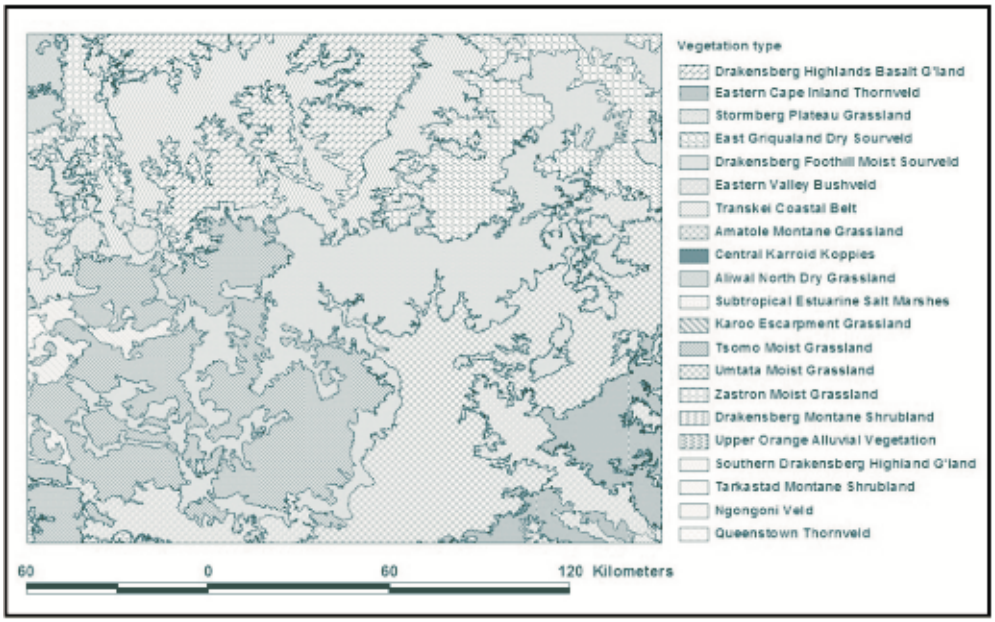


Figure 8: *The new South African vegetation map, due to be published in 2004, maps land classes throughout the country at 1:250 000 scale. It was mapped by different experts in different parts of the country, and will provide a valuable spatial data layer for conservation assessment. A small section of the map from the Eastern Cape is shown here.*

In Chapter 3 we discussed the need to conduct the conservation assessment component of a conservation plan according to systematic conservation planning principles (the principles of representation and persistence). Throughout this chapter, a systematic approach to the conservation assessment exercise is taken as a starting point. Systematic conservation assessment is a data-driven activity, requiring specialist conservation planning expertise, high-level GIS skills, and knowledge of the ecology of the region for which the plan is being done. It involves four main tasks:

- developing spatial data layers (for biodiversity features, habitat transformation, future land-use pressures, and existing protected areas);
- setting conservation targets;
- putting it all together to identify options for meeting conservation targets;
- interpreting the results for end-users.

Key lessons with respect to the first three tasks are discussed in this chapter. The fourth is the subject of Chapter 6. We end off the chapter with some recommendations on data collection for conservation assessment, and a note about rapidly done, simple plans – which, depending on the circumstances, can be more appropriate than more complicated, time-intensive plans.

DEVELOPING SPATIAL DATA LAYERS

Spatial data layers that represent biodiversity features (pattern and process), habitat transformation, existing protected areas and future land-use pressures, are key elements of a systematic conservation assessment. We highlight lessons in relation to each of these.

MAPPING BIODIVERSITY PATTERN

Biodiversity pattern includes genes, species and habitats[10] – a complex set of features to map. Our main lessons for mapping biodiversity pattern have to do with using land classes and species distribution data.

Land classes as a biodiversity feature

Land classes, such as vegetation types or habitat types, provide

10. Our focus is on species and habitats since there are virtually no data on patterns of genetic diversity within species and it is unlikely that such information will emerge in the short to medium-term when planning is most urgently required.

an effective and inexpensive region-wide biodiversity feature, ensuring that biodiversity pattern is sampled across the landscape.

"A map of land classes is an effective way of representing biodiversity pattern. It provides a continuous layer that covers the entire study area."

If land classes incorporate expert knowledge about biological characteristics, they are better surrogates for biodiversity pattern than species distribution data.[11] On-the-ground expert mapping of land classes is the "first prize" method for developing a layer of land classes. If time and budget constraints make this infeasible, a combination of modelling and expert knowledge can be used.

"If possible, experts with on-the-ground ecological and biological knowledge should be involved in mapping land classes."

Species distribution data as a biodiversity feature

Most South African conservation assessments have used species records, or generated distribution maps for species based on expert knowledge and historical records of their distribution in relation to land classes. However, although desirable, species distribution data are not essential for a conservation plan, and should be used with caution for at least three reasons:

- collection bias, which is almost inevitable (see Figure 9);[12]
- scale (data are often available only at a broad scale, e.g. quarter degree square);
- problems with extrapolating from one species group to another.

Unless comprehensive coverages of point locality data are available for a full array of indicator taxa (assuming that these can be identified), the use of species distribution data can lead to biases, with the selection of conservation priorities biased towards areas for which species distribution data happen to be available. In practice, most species distribution data give inadequate coverage and are available at a scale too crude to be useful. The box below elaborates based on lessons from C.A.P.E.

"Species distribution data are not essential for a conservation plan, and should be used with caution."

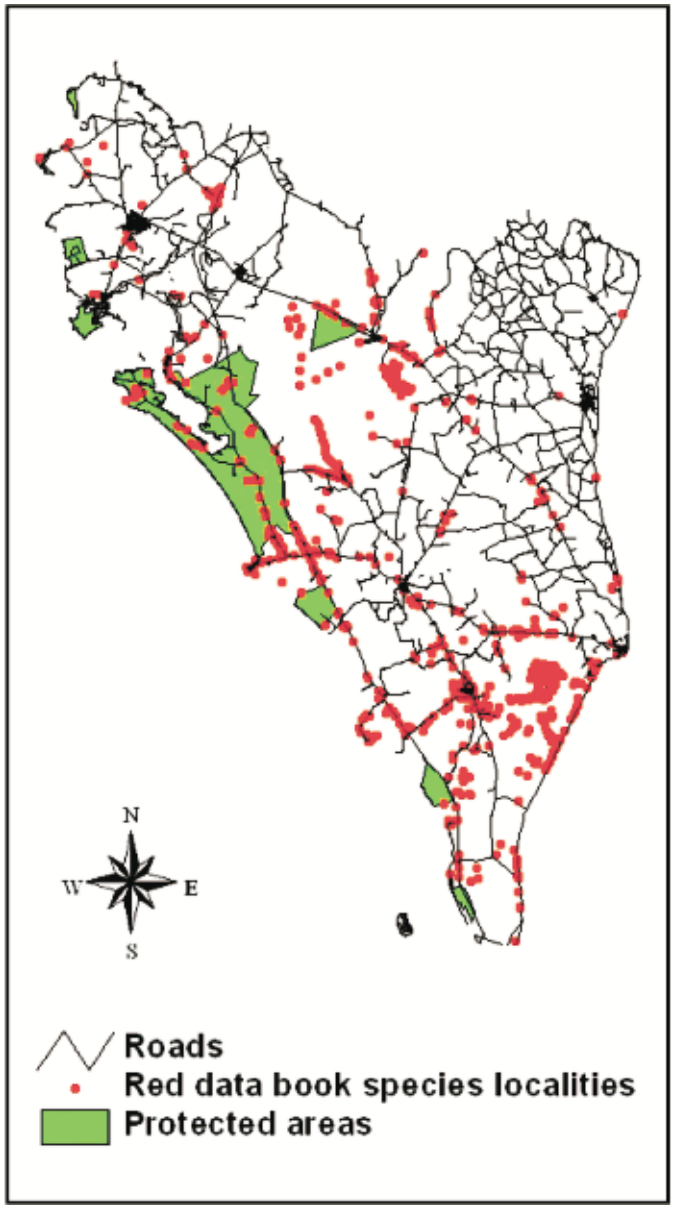


Figure 9: *One of the reasons for using species distribution data with caution is collection bias. Species distribution records tend to be concentrated along roads or in areas that happen to be accessible to researchers and field workers. This map of the well-surveyed Saldanha area on the Cape west coast shows the high proportion of Red Data List species records that fall close to roads or in protected areas.*

If comprehensive coverages of point locality species distribution data are available, particularly for rare or endangered species, these can be a valuable supplement to the layer of land classes, especially when planning at a fine scale. Rare species especially may fall through the "coarse filter" net provided by land classes.

"Species distribution data, especially for rare or endangered species, can be used to supplement a continuous biodiversity feature layer, ONLY IF a good coverage is available at an appropriate scale."

11. We note that this may not be the case in all biomes, particularly where distinct changes in vegetation may be difficult to discern.
12. This may be able to be overcome in some cases by modelling species ranges.

A lesson from C.A.P.E. on using species distribution data versus land classes in conservation assessment

The C.A.P.E. project provided an important lesson for SKEP and STEP regarding the use of species localities versus vegetation types in conservation assessment. The C.A.P.E. conservation plan used a combination of land classes and species distribution data. Lombard et al. (2003)[13] showed that when targets were set for each of 364 species of Proteaceae, comprising a massive 183 181 point locality records, this taxon was not very effective in achieving targets for vegetation types – it was a poor surrogate. The reason for this was that Proteaceae do not grow in all of the vegetation types found in the Cape Floristic Region. However, achieving targets for vegetation types *also* achieved targets for all but a small subset of extremely rare Proteaceae. Vegetation types or land classes were thus a good surrogate for Proteaceae, but the reverse was not true – Proteaceae were not a good surrogate for land classes.

Note that the Proteaceae data set was compiled over ten years at a cost of approximately R2.5 million (in 1991-2001 Rands), not including the in-kind contributions of hundreds of volunteers (Rebelo 2002).[14] Given the urgency of identifying conservation priorities, and the scarce resources available for conservation assessments, the simultaneous collection of presence-absence data sets for an effective array of indicator taxa (i.e. those taxa associated with the full array of environments in a planning domain) is unrealistic. The time and cost involved made this an impossible task for all three bioregional conservation plans in southern Africa (C.A.P.E., SKEP and STEP), and would also make it impossible in most other biologically rich bioregions in the developing world.

We do not wish to downplay the importance of species-based inventories or their value for taxonomic research. However, unless comprehensive for a range of taxa, these data have limited applicability in systematic conservation assessment.

MAPPING ECOLOGICAL AND EVOLUTIONARY PROCESSES

In order to include an ecological or evolutionary process explicitly in a spatial conservation plan, we need to be able to identify a

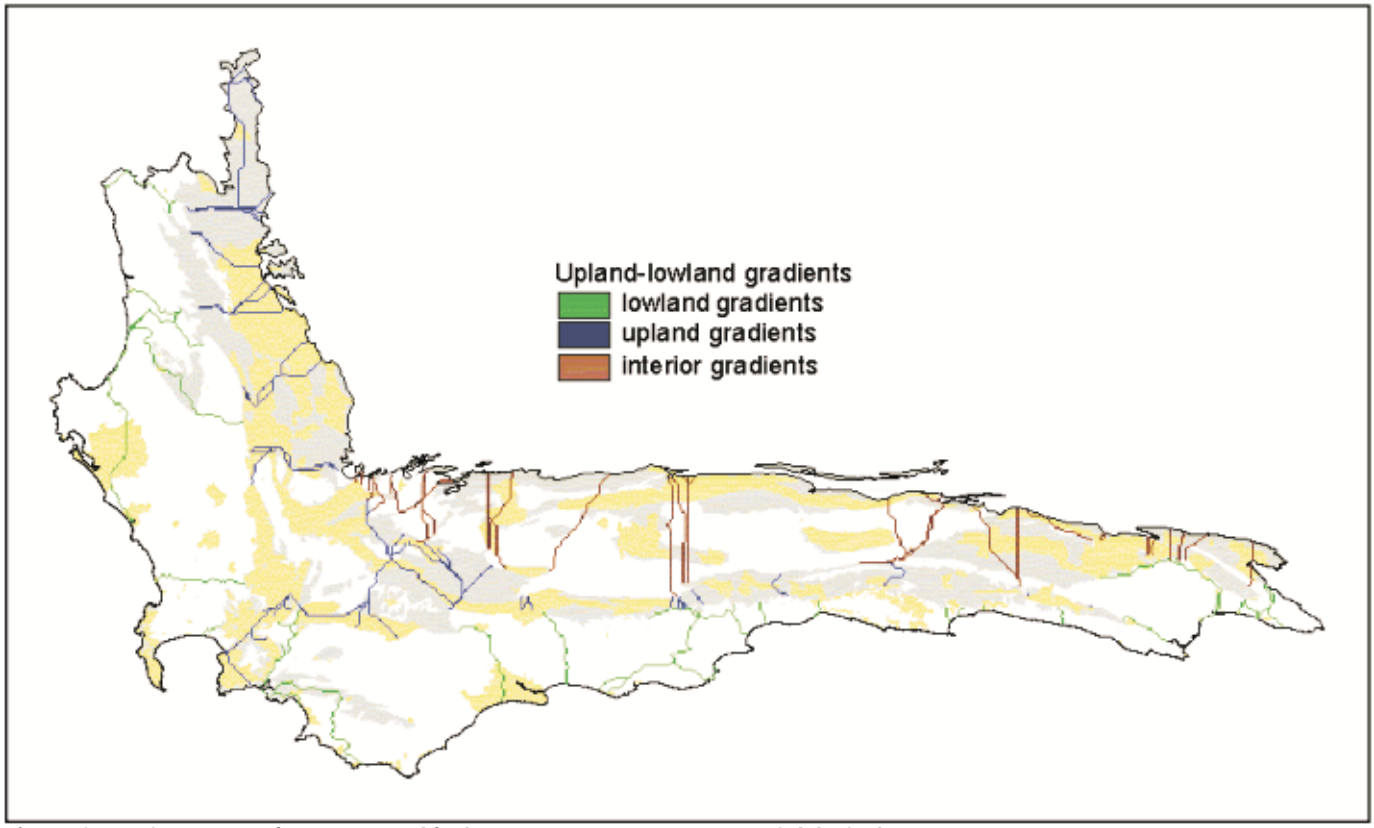


Figure 10: *Spatial components of processes mapped for the C.A.P.E. conservation assessment included upland-lowland gradients. These link major topographic regions and traverse untransformed habitat as much as possible.*

13. Lombard A.T., Cowling R.M., Pressey R.L. & Rebelo A.G. 2003. Effectiveness of land classes as surrogates for species in conservation planning for the Cape Floristic Region. *Biological Conservation* 112: 45-62.
14. Rebelo, A.G. 2002. An assessment of the Protea Atlas Project: Background report. Cape Town National Botantical Institute.

spatial component of the process that can be represented on a map, or at least its spatial requirements. However, much of the literature on ecological and evolutionary processes is spatially inexplicit – it does not address the location of these processes in space, or deal with how they might be spatially represented. We cannot delay conservation planning while waiting for the required data to accumulate, given the urgency in most parts of the world to identify priority areas and implement conservation action.

"Mapping ecological processes involves identifying their spatial components. Because much of the literature on ecological processes is spatially inexplicit, this is often a challenge."

South African conservation planners have dealt with this mainly by drawing on expert knowledge of the ecology of the region to identify and map spatial components of ecological processes, and in some cases to develop algorithms to determine their most efficient location. The key lesson is that mapping spatial components of ecological processes inevitably requires expert knowledge of the ecology of the region. Only once these spatial components have been identified and characterised, is it possible to use, say, remote modelling to develop a layer of these components for a conservation assessment.

"Defining spatial components of ecological processes involves expert judgement, based on knowledge of the ecology of the region."

MAPPING HABITAT TRANSFORMATION

Areas where there is no longer any remaining natural habitat are generally considered unavailable for meeting conservation targets. This means that conservation assessment requires a map of habitat transformation, ideally distinguishing between irreversibly transformed areas, areas that have been transformed to some extent but could be restored, and areas where natural habitat remains intact.

Areas of natural habitat would be our first choice for meeting conservation targets, but if it is not possible to meet targets in areas of natural habitat, restorable areas are the next best option. These might include areas that have been infested with alien invasive species or areas that have been overgrazed but still retain much biodiversity. In addition, we may wish to prioritise restoration in habitat that forms part of the spatial component of an ecological process.

"Ideally three categories of habitat need to be identified: irreversibly transformed areas, restorable areas, and areas where natural habitat remains intact."

Mapping irreversibly transformed habitat (as a result of, for example, crop agriculture, urban development or certain types of mining) is generally straightforward, and can usually be done from a satellite image, combined with expert knowledge and ground-truthing if necessary. Identifying areas where habitat has been partially transformed but is restorable is more complicated. We have identified two main challenges. The first is defining what we mean by "restorable" on the ground. The cut-off point between habitat that is restorable and habitat that has been so severely degraded it is no longer able to recover, is not always obvious. Assuming that a definition of "restorable" is agreed on, the next challenge is to map such habitat, either remotely or on the ground. In some landscapes remote mapping may be relatively easy; in others it can prove extremely difficult. We have learnt that the successful mapping of partially transformed restorable habitat requires careful planning and trialling, and a great deal of thought must be put into this in the very early stages of an assessment.

"Mapping partially transformed restorable habitat is not easy and requires careful conceptual planning and trialling."

MAPPING LAND-USE PRESSURES

Conservation assessment aims to take into account both the biodiversity features of an area, and the extent to which these biodiversity features are vulnerable to future loss. Given that habitat loss is the single biggest cause of biodiversity loss, an effective way to represent vulnerability is to map future land-use pressures that would result in loss of natural habitat, and to factor this into a strategy and action plan.

Mapping future land-use pressures is a complex business. In fact,

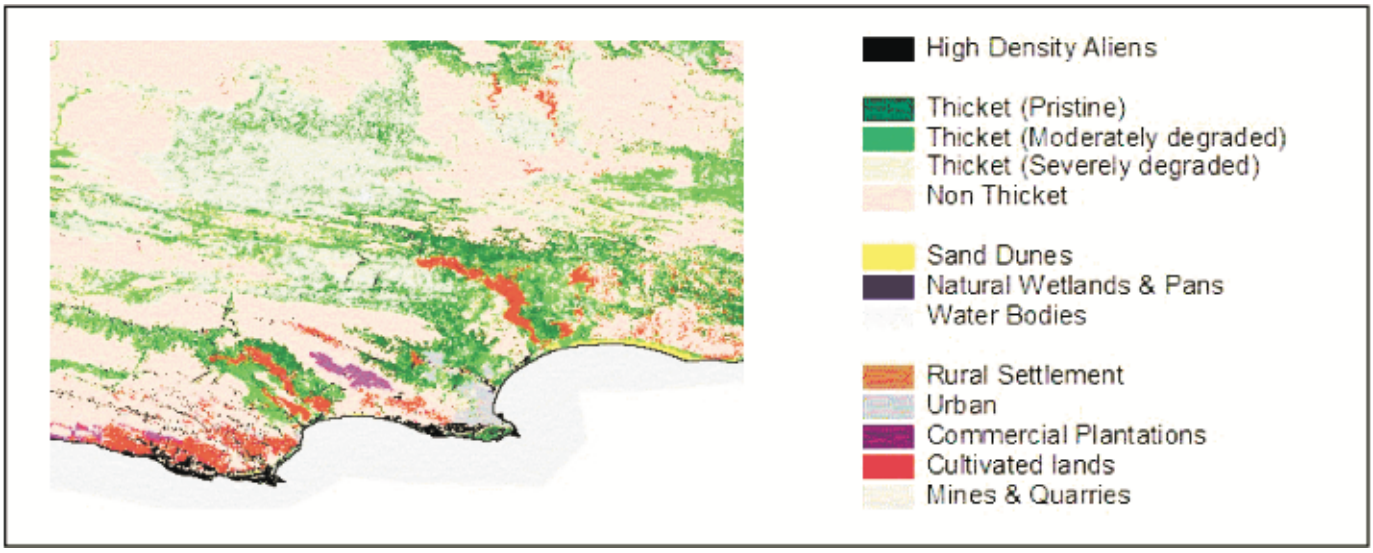
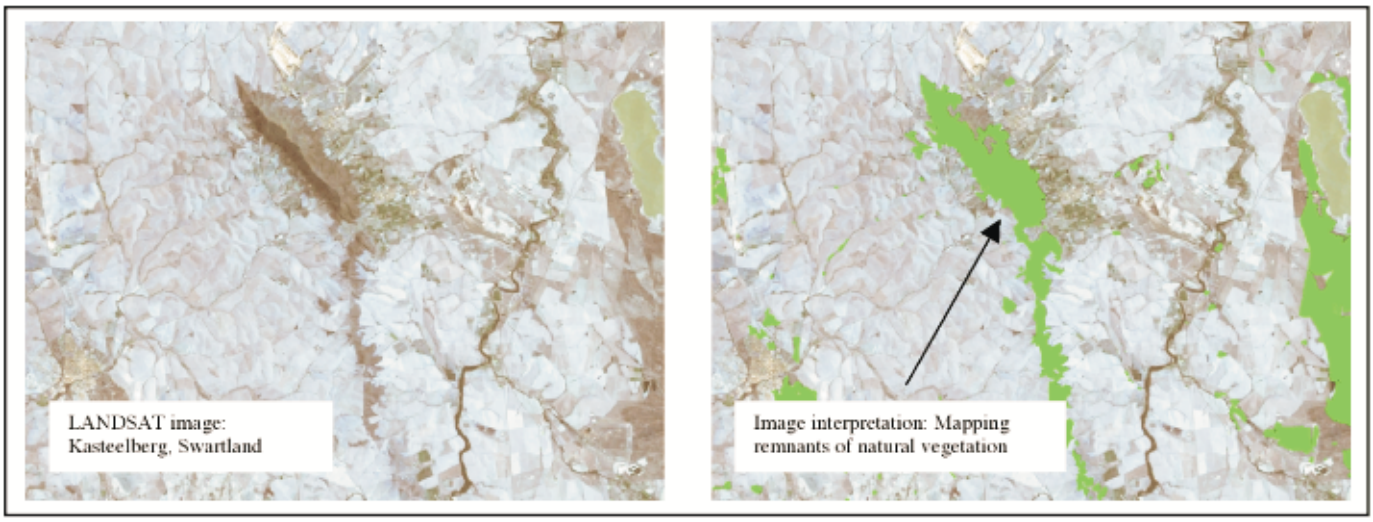


Figure 11: *The STEP conservation assessment mapped several categories of transformation and degradation, including irreversibly transformed habitat, habitat with high densities of alien invasive species, severely degraded thicket, and moderately degraded thicket.*

Figure 12: *The Cape Lowlands Renosterveld conservation assessment used a satellite image as a starting point for identifying patches of remaining renosterveld vegetation. The results were ground-truthed by an expert in the field.*



simply predicting the rate of growth of any economic sector or sub-sector is complex, given the many variables and idiosyncrasies involved. To take such a market prediction and make it spatial is even more tricky. The lesson that has emerged from the South African experience is: keep it simple. In practice, this means:

- Keep timeframes relatively short (five to ten years at most). The further into the future one tries to predict the more unpredictable factors (such as technological advances, new cultivars, unexpected shifts in demand) can play havoc with the best models or predictions.
- Experts can play a key role. It is easy to over-invest time and effort in modelling future land-use pressures when a few hours with some well-chosen experts in relevant fields, who are in touch with market developments, can supply the spatial information needed. Drawing on expert knowledge is often a way of cutting down on the costs and frustration of gathering and analysing hard quantitative spatial data on future land-use pressures, *and* getting a better result. A good expert will be able to give an assessment of the degree of accuracy of the information they provide, and likely weak points. These can be worked on further, for example, by consulting other experts or by gathering specific additional data, if time allows. We need to explore expert mapping techniques for future land-use pressures more fully.

- If future land-use pressures are modelled, avoid complex statistical models in favour of simple rule-based methods that draw on expert knowledge (see Figure 13).
- Find out about programmes and interventions, such as new dams and irrigation schemes, that are likely to lead to large-scale habitat transformation in areas previously not under pressure from alternative land uses.

"Mapping future land-use pressures is complex. Keeping timeframes short, avoiding complex statistical models, and drawing on expert knowledge are ways to make the task manageable and get a better quality data layer."

MAPPING EXISTING PROTECTED AREAS

Existing protected areas contribute towards meeting conservation targets for some biodiversity features, albeit usually a biased sample. A systematic conservation assessment thus requires a map of existing protected areas. However, not all protected areas offer equal degrees of protection of biodiversity. Ideally we would like to categorise protected areas according to a combination of legal status and management effectiveness, but data on management effectiveness are difficult to collect and sensitive to use, and management effectiveness is open to intervention as part of the conservation strategy and action plan.

The main lesson with respect to mapping existing protected areas is to distinguish between statutory or similarly secure protected areas and others. Statutory or secure protected areas should be treated as already contributing to meeting targets for biodiversity features, while non-statutory or less secure protected areas represent spatial conservation opportunities, for example by providing an initial mechanism for engaging with landowners or users.

A NOTE ON INCORPORATING EXPERT KNOWLEDGE

Systematic conservation planning and expert-driven conservation planning are often seen as opposing or contradictory approaches. However, it is possible and usually necessary to incorporate expert knowledge into a systematic conservation assessment. We have seen in the preceding discussion in this chapter how expert

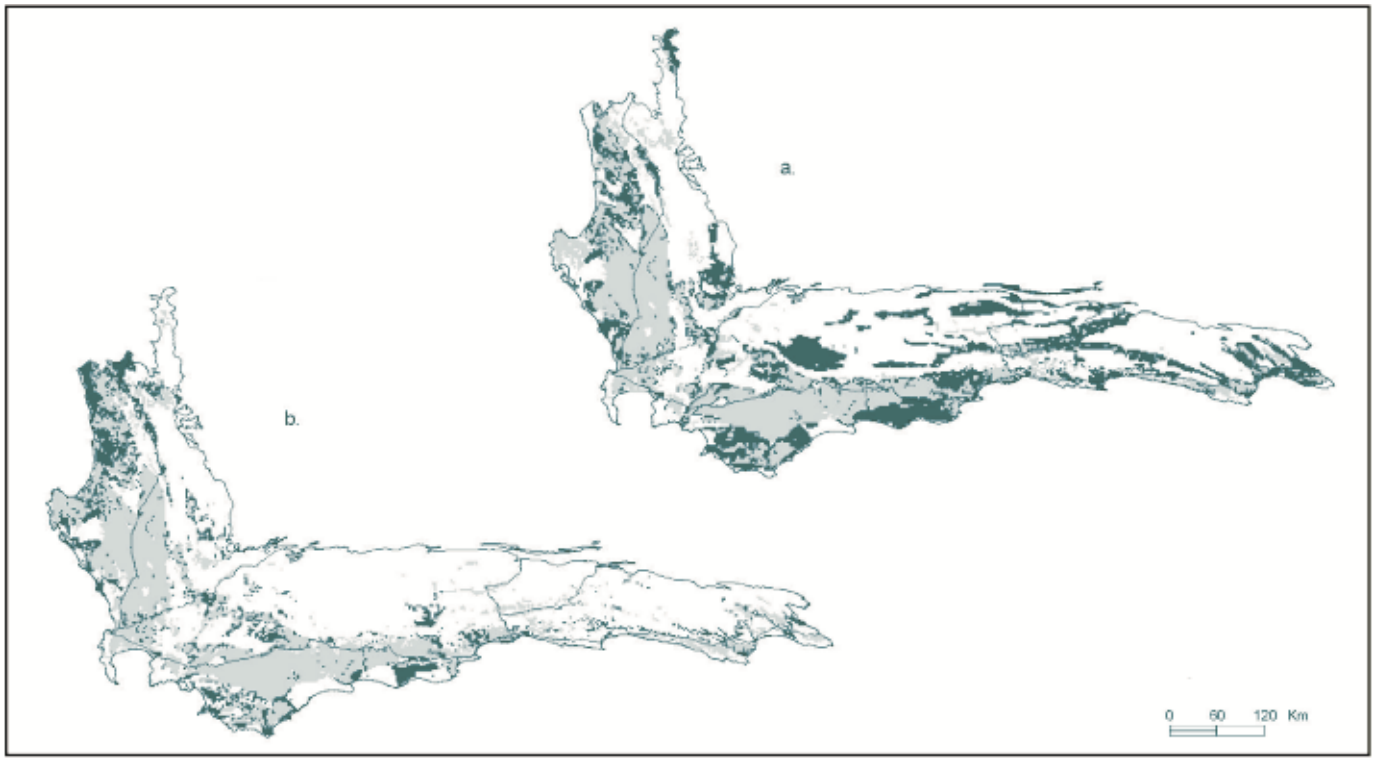


Figure 13: *For the C.A.P.E. conservation assessment, rule-based modelling of future agricultural pressures based on expert knowledge (shown in (a)), was compared with statistical modelling using biophysical factors as predictors of agricultural pattern (shown in (b)). The dark areas represent high land-use pressure from crop agriculture. The more complex statistical modelling approach underestimated agricultural pressures considerably, since it was based on existing patterns and could not take into account the rapid expansion of new crops (such as rooibos tea, cut flowers and new wine cultivars) into largely untransformed areas that were unsuitable for existing crops.*

knowledge is often a crucial input in mapping land classes, ecological and evolutionary processes, habitat transformation (especially partially transformed habitat) and future land-use pressures. Expert knowledge is also important for providing the rules for decision-support analysis. Although systematic conservation assessment is data-driven and target-driven, rather than expert-driven, it can and does draw substantially on expert knowledge.[15]

"Expert knowledge is crucial for conservation assessment, but must be used within a systematic framework that is data-driven not expert-driven."

We recognise that the existence of experts with on-the-ground ecological knowledge should not be taken for granted. In South Africa we are fortunate to have a long tradition of natural history research and a relatively broad base of expert knowledge on which to draw, especially compared to some other developing countries. There is no quick way to develop this capacity if it does not exist.

SETTING CONSERVATION TARGETS

Conservation targets lie at the heart of systematic conservation assessment. They answer the question: how much is enough to ensure the long-term persistence of biodiversity, and hence, a living landscape? As discussed in Chapter 2, targets must be quantitative and explicit, and can be set for any biodiversity feature. Key lessons from the South African experience relate to setting targets for land classes.

The first lesson is that the IUCN's flat 10% guideline is not an appropriate target for land classes. Because it is not based on biological characteristics or variation, it leads to under-representation of biodiversity pattern, especially for land classes that support many rare species.[16] Instead of applying a flat 10%, targets for land classes should take biological heterogeneity into account.

"Targets for land classes should be based on biological heterogeneity, rather than using a flat 10% target."

Targets for land classes based on biological heterogeneity can be developed using different techniques. A recent innovation in South Africa, pioneered in the SKEP and STEP conservation plans, is the use of species-area relationships within land classes (see Figure 14) to develop these targets. This technique is described fully in the SKEP and STEP technical reports. It requires survey plot data distributed across a range of land classes in the study area. Using this method for SKEP and STEP resulted in targets that ranged from 10% of original extent for the least heterogeneous land classes, up to 50% for the most heterogeneous.

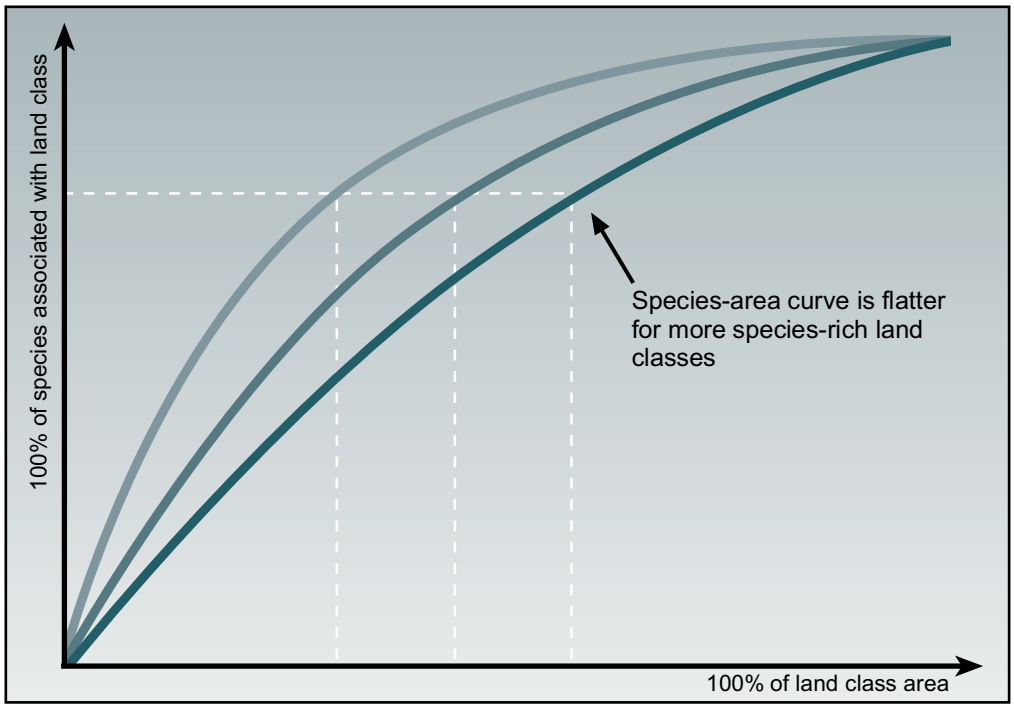


Figure 14: *The species-area relationship within a land class can be illustrated by a species-area curve, which graphs the proportion of species in a land class surveyed relative to the area of the land class surveyed. Species-area curves for more heterogenous (species-rich) land classes are flatter than those for more homogenous (less species-rich) land classes.*

15. For suggestions on incorporating expert knowledge into systematic conservation planning see Cowling, R.M., Pressey, R.L., Sims-Castley, R., Le Roux, A., Baard, E., Burgers, C.J. & Palmer, G. 2003. The expert or the algorithm? Comparison of priority conservation areas in the Cape Floristic Region identified by park managers and reserve selection software. *Biological Conservation* 112: 147-167.
16. For further discussion see Pressey R.L., Cowling, R.M. & Rouget, M. 2003. Formulating conservation targets for biodiversity pattern and process in the Cape Floristic Region, South Africa. *Biological Conservation* 112: 99-127.

"Where appropriate data are available, targets based on species-area relationships within land classes provide reasonable estimates."

The second lesson is that incorporating land-use pressure or vulnerability to future transformation into targets for land classes (for example in the form of retention targets) is problematic, for two reasons. Firstly, future land-use pressure is extremely difficult to predict spatially in a defensible way, as we discussed earlier in this chapter. More importantly, combining measures of biological heterogeneity with measures of land-use pressure in a single target creates conceptual confusion. It means that it is not possible to distinguish between priority areas based on their biological characteristics, and priority areas based on vulnerability. Vulnerability to future transformation is an important information layer to use in helping to make choices about where to meet targets in cases where there are options, and for scheduling conservation action, but should not be used to set targets.

"Incorporating vulnerability to future land-use pressures in targets for biodiversity features should be avoided. Vulnerability needs to be an independent spatial layer, used to help make choices about where to meet targets in cases where there are options, and to schedule conservation action based on competing land uses."

PUTTING IT ALL TOGETHER: A MAP OF CONSERVATION OPTIONS

The spatial layers we've discussed above, together with conservation targets for biodiversity features, provide the building blocks of a systematic conservation assessment. They need to be analysed to identify priority areas for conservation action.

Because of the sheer amount of information involved, this inevitably requires some kind of software to undertake the necessary analyses.

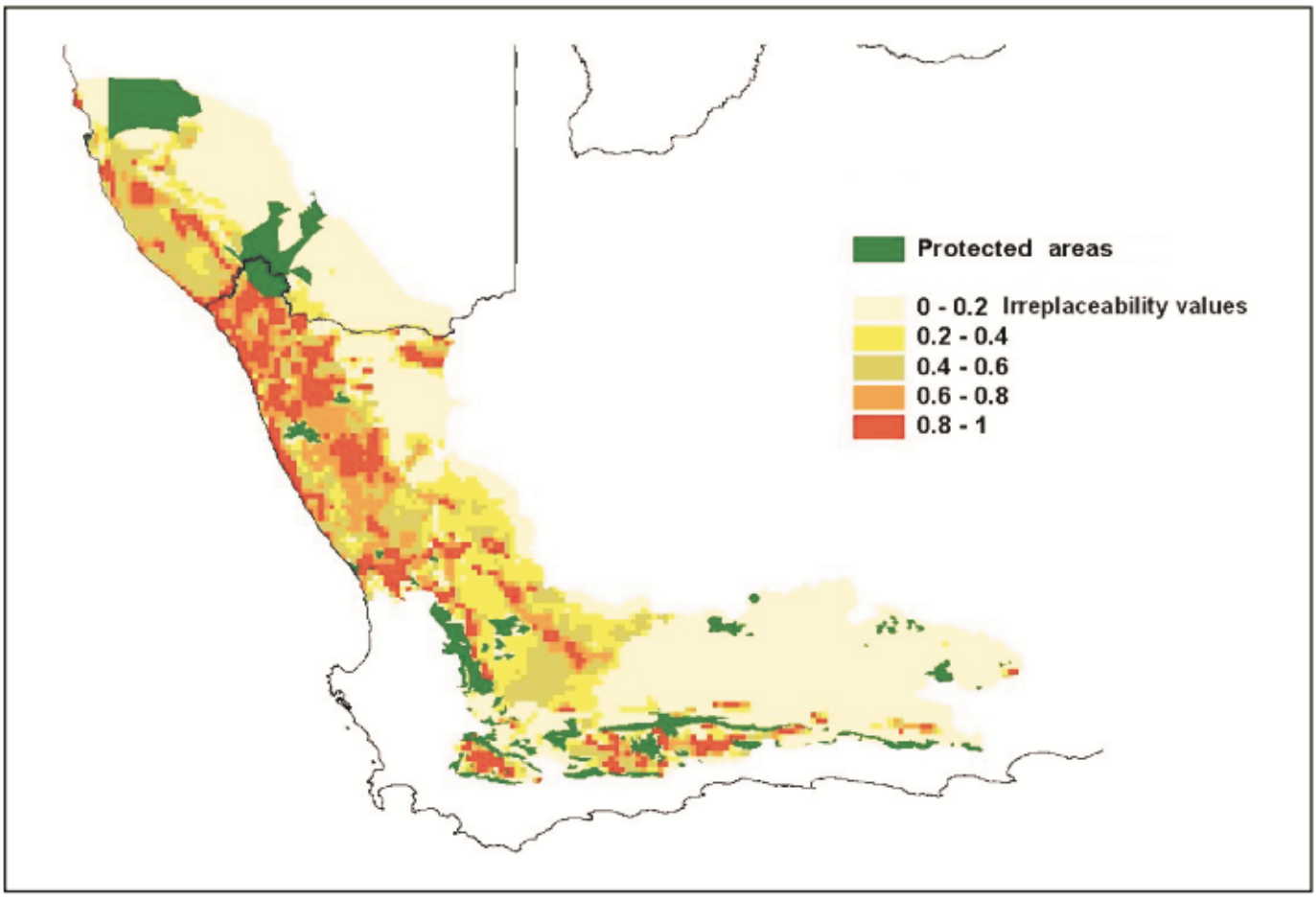


Figure 15: *The strength of C-Plan is that it summarises options for meeting conservation targets and displays them spatially, in the form of an irreplaceability map. The SKEP irreplaceability map is shown here. In contrast, minimum set analyses, frequently used for conservation planning, present a single spatial configuration that is just one of many possible solutions.*

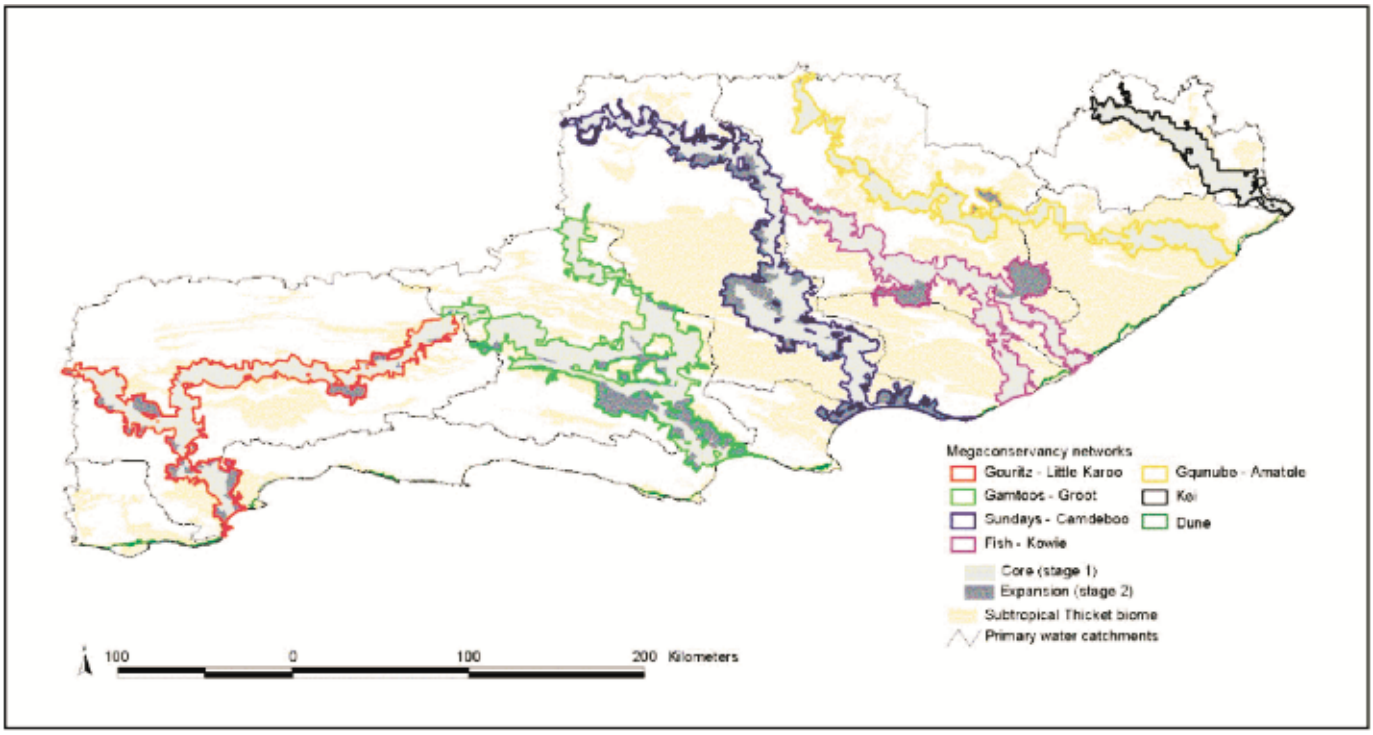


Figure 16: *An irreplaceability map leaves open the question of where targets should be met in cases where there are options. There are different possible ways to answer this question. The STEP conservation assessment identified priority corridors for conservation action (termed mega-conservancy networks) based on a combination of factors including the location of spatial components of ecological processes (such as upland-lowland gradients and macro-climatic gradients), irreplaceability values and future land-use pressures.*

For systematic conservation assessments, the most frequently used software in South Africa is C-Plan[17] together with a GIS. A major output from C-Plan is an irreplaceability map, or a map of conservation options. An irreplaceability map summarises the degree to which options exist in the landscape for meeting conservation targets, giving different parcels of land a score between 0 (which means either that there is no remaining natural habitat in that parcel or that targets for all features in that parcel have already been met) and 1 (which means that all remaining natural habitat in that parcel is required to meet targets).

C-Plan is one of several software systems that can be used for conservation assessment. The advantage of C-Plan over other systems is that it presents options for achieving conservation targets. Other conservation planning software, for example software that uses only minimum set algorithms to calculate the smallest set of sites needed to meet conservation targets, presents only one solution out of many possible solutions. C-Plan summarises options and displays them spatially, rather than presenting a single "black box" solution.

"The strength of C-Plan is that it summarises options for meeting conservation targets and displays them spatially, rather than presenting a single 'black box' configuration that is one of many possible solutions."

This does mean that choices about exactly where to meet targets (in cases where options exist) still need to be made. In some cases it may be appropriate for managers and ecologists in conservation implementing agencies, who have local knowledge of implementation opportunities and constraints, to make these decisions. In other cases, further analysis using a software-based prioritisation framework that takes into account factors such as competing land uses, is appropriate. The STEP conservation plan identified mega-conservancy network corridors based on such an approach, where irreplaceability was only one of several criteria used in identifying the corridors.

In Chapter 6, we discuss the fact that while a map of options is a powerful tool, it presents information in a format that is not equally useful for all users.

17. C-Plan was developed by the New South Wales National Parks and Wildlife Service to assist conservation planners to identify and evaluate spatial options for the development of conservation systems. (See Ferrier, S., Pressey R.L. & Barrett, T.W. 2000. A new predictor of the irreplaceability of areas for achieving a conservation goal, its application to real-world planning, and a research agenda for further refinement. *Biological Conservation* 93: 303-325; http://www.ozemail.com.au/~cplan.)

GUIDELINES ON DATA COLLECTION FOR CONSERVATION ASSESSMENT

A lesson that has emerged clearly from the South African experience is that not all spatial data are useful for conservation assessment. This means that it is important for the conservation assessment team not to launch into gathering together all existing spatial data for a region without considering whether they will be useful or not. It also has more general implications for how we allocate effort and resources in gathering or generating new spatial data.

"Not all spatial data are useful for systematic conservation assessment. The conservation assessment team needs to consider which of the existing data will be useful before spending time and resources on acquiring them."

At the moment, lack of spatial data on ecological and evolutionary processes is a constraint in conservation assessment in South Africa. In contrast, data on biodiversity pattern, which includes vegetation types or land classes, species distributions, or other special biodiversity features, is usually not the major limiting factor in conservation assessment.

This means that from the point of view of conservation assessment, ongoing efforts to refine and improve data on biodiversity pattern are not the most effective use of scarce conservation resources. Resources would be spent more usefully on research on spatial components of processes, or on accurate transformation maps (that identify restorable as well as irreversibly transformed habitat) and refining land class boundaries in priority areas, than on collecting and curating species distribution data. If resources are allocated to improving species distribution data, it makes sense to concentrate on rare and endangered species in priority areas for conservation action. Data on these species can be useful for fine-scale conservation.

"From a conservation assessment point of view, it makes more sense to invest data collection resources in mapping spatial components of ecological processes, land class boundaries, and transformation (including restorable habitat), than in collecting and curating species distribution data."

We would like to make the following general recommendations for data collection efforts to support conservation assessment in species-rich areas:

- Focus on mapping land classes and identifying spatial components of ecological and evolutionary processes as a higher priority than mapping species distributions.
- Species-level data collection should focus on species of special concern, such as Red Data List species and local endemics, should be as spatially comprehensive as possible, and should be captured at a fine scale.
- Plot (survey) data for a particular planning domain need to be collated, geo-referenced, and made electronically available for target setting and other applications.
- Inexpensive ways of mapping partially transformed restorable habitat need to be explored, for example mapping grazing impacts, alien invasive plants, and selective logging.

A SIMPLE, RAPIDLY COMPLETED PLAN IS BETTER THAN NO PLAN

We end off this chapter with a lesson that applies to the conservation assessment process as a whole rather than to a specific aspect of it: a simple plan, even one quickly done based on imperfect data, is better than no plan. This is not an easy lesson for many conservation scientists, who, like scientists in all fields, are often reluctant to give definite answers or put forward clear guidelines when the questions are complex and the answers uncertain.

We have learned that it is possible to do a rapid systematic conservation assessment with a few key data layers, and that in some circumstances it makes more sense to do this than to work for years on a more complex assessment involving huge amounts of data. When the bulldozers are running, a simple plan is definitely better than no plan. It can always be revised at a later date.

An example comes from the Knersvlakte in the succulent karoo, where mining is a major pressure in the unique quartz and limestone habitats that are home to many endemic dwarf succulents. A systematic conservation assessment done in 1999 at 1:10 000 scale in under a year, using one key data layer of land classes,[18] has been widely quoted and used by planners, environmental

18. Desmet, P., Barrett, T., Cowling, R.M., Ellis, A., Heijnis, C., Le Roux, A., Lombard, A. & Pressey, R. 1999. A systematic plan for a protected area system in the Knersvlakte region of Namaqualand. Institute for Plant Conservation, University of Cape Town.

consultants and land-use decision-makers and has stood in the way of mining on many valuable sites. Without the plan officials and consultants involved in the decision-making process would have had difficulty motivating the retention of particular sites to decision-makers. The Knersvlakte conservation plan is currently being refined and extended to cover a larger area.

"In areas that are known to have significant concentrations of biodiversity, and where land-use pressures are high, a rapid systematic conservation assessment based on available or easily derived data layers can be a powerful tool for preventing biodiversity loss."

Rapid conservation assessments require experienced conservation assessment team members who can draw on lessons and experience from previous planning initiatives. In South Africa, the sequential timing of major conservation planning initiatives has been enormously valuable. Some team members have been common to several projects, which has meant that later assessments have been able to draw on the lessons of earlier assessments. This has allowed teams to work within tight timeframes and to simplify the assessment process where appropriate, without making it simplistic. This would not have been possible if each conservation assessment team was learning the ropes from scratch.

"Rapid conservation assessments rely on experienced team members who are able to draw on lessons from their involvement in previous projects."

6. FROM CONSERVATION OPTIONS MAP TO END-USER PRODUCT

In Chapter 5 we discussed how a systematic conservation assessment provides an irreplaceability map that sets out options for meeting conservation targets. It tells us where we have few or no options for meeting targets, and where several or many options still exist. This is a powerful tool – more powerful in many ways than a map that sets out just one of many possible spatial configurations for meeting conservation targets. However, we have found that irreplaceability maps are not equally useful for all stakeholders or all potential users of conservation planning products.

In particular, a conservation options map is of limited use to someone who needs to make a decision about the future of a particular individual piece of land – the situation faced by many officials, decision-makers and individual or communal landowners in the urban, agricultural, mining, industrial and tourism sectors.

Especially for land-use planners and decision-makers, a map of conservation options is insufficient. For example, to say that a particular planning unit has an irreplaceability value of 0.70 is of limited use to a land-use planner. What does this mean in practice? What biodiversity features are driving this irreplaceability? What level of ecological functionality is required of such a piece of land in order to meet conservation targets? Does this differ depending on whether the piece of land is a last remaining fragment of natural habitat in an agricultural belt or, say, a relatively large tract on the edge of an urban settlement?

"A map of irreplaceability is not especially useful for most users of conservation planning products, including local government and other government departments involved in land-use planning and decision-making."

Conservation options maps display results using planning units. Planning units can be any shape, as long as they cover the whole area being planned for and their size is appropriate for the scale of the conservation assessment. Commonly used planning units are a grid of sixteenth degree squares for broad-scale plans, and cadastral units (farm boundaries) or a finer grid for fine-scale plans.

Planning units bear no relation to actual biodiversity features on the ground, and are difficult for most users of conservation planning products to relate to. Cadastral units are somewhat better than grid squares from some points of view, but can be problematic, not least because landowners whose properties are identified as highly irreplaceable tend to get nervous that their land is about to be whisked away by conservationists, unless the release of this information is very carefully managed. In addition, displaying results using planning units can be misleading. A planning unit may have a high irreplaceability value because of a biodiversity feature located in one tiny corner of it. It is often the feature we are interested in, not the planning unit, especially if our aim is not to establish a formal protected area but to influence land-use decisions and management across multiple sectors of the economy.

Instead of using planning units to display conservation assessment results, it makes sense to use actual biodiversity features, and to display spatial information about their conservation status. For example, one can display information about the conservation status or priority of different land classes, and show where specific spatial components of processes are located. Cadastral boundaries can be used as a backdrop if this is helpful.

Maps that display conservation status or priority of biodiversity features need to be accompanied by guidelines that help end-users interpret what they mean in practice, especially for land-use decision-making and land management – the "so what" question. For example, what does it mean to say that a particular land class is endangered, or part of a priority conservation area or corridor? What can and can't be done with such a piece of land and what land uses are and aren't compatible with conserving biodiversity?

"Results of a conservation assesment need to be displayed showing conservation priority of actual biodiversity features rather than irreplaceability of planning units, and accompanied by guidelines for land-use management in priority areas."

We have limited experience with this process of displaying irreplaceability maps differently, and developing guidelines to accompany them. There are many possible ways to achieve this. It may involve deciding where best to meet conservation targets

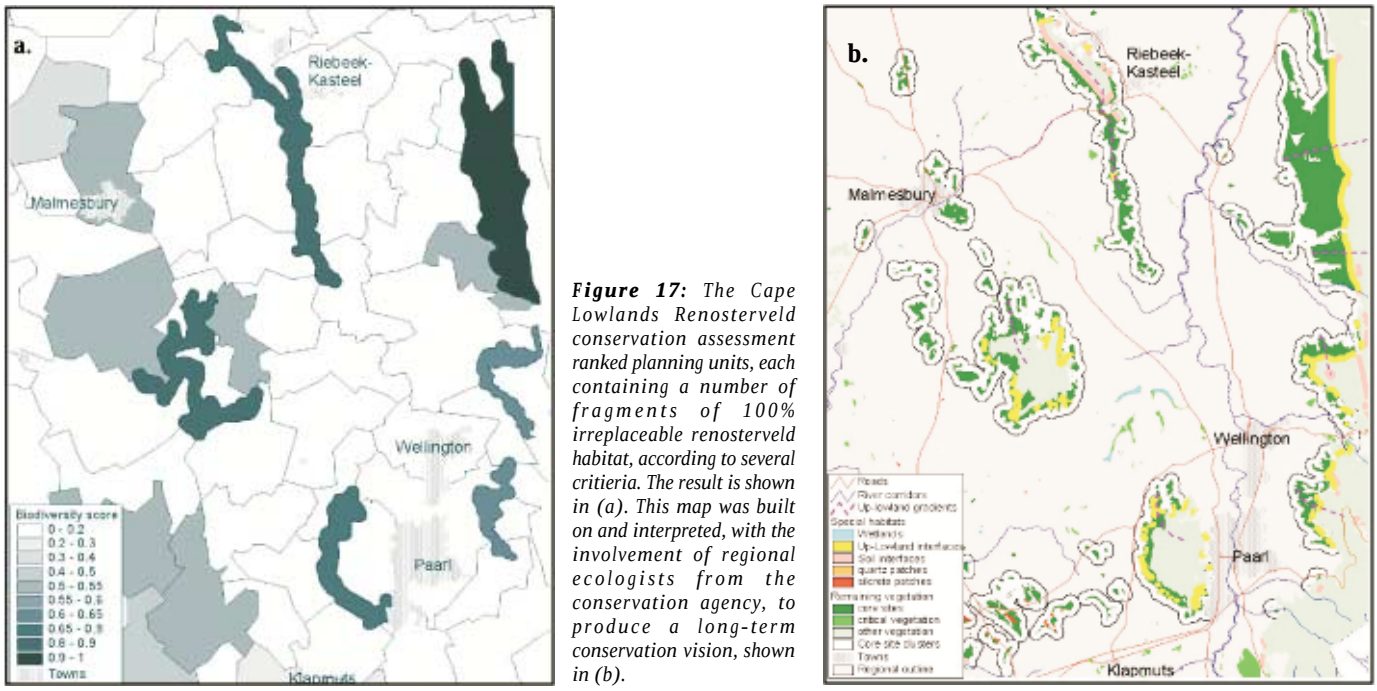


Figure 17: *The Cape Lowlands Renosterveld conservation assessment ranked planning units, each containing a number of fragments of 100% irreplaceable renosterveld habitat, according to several critieria. The result is shown in (a). This map was built on and interpreted, with the involvement of regional ecologists from the conservation agency, to produce a long-term conservation vision, shown in (b).*

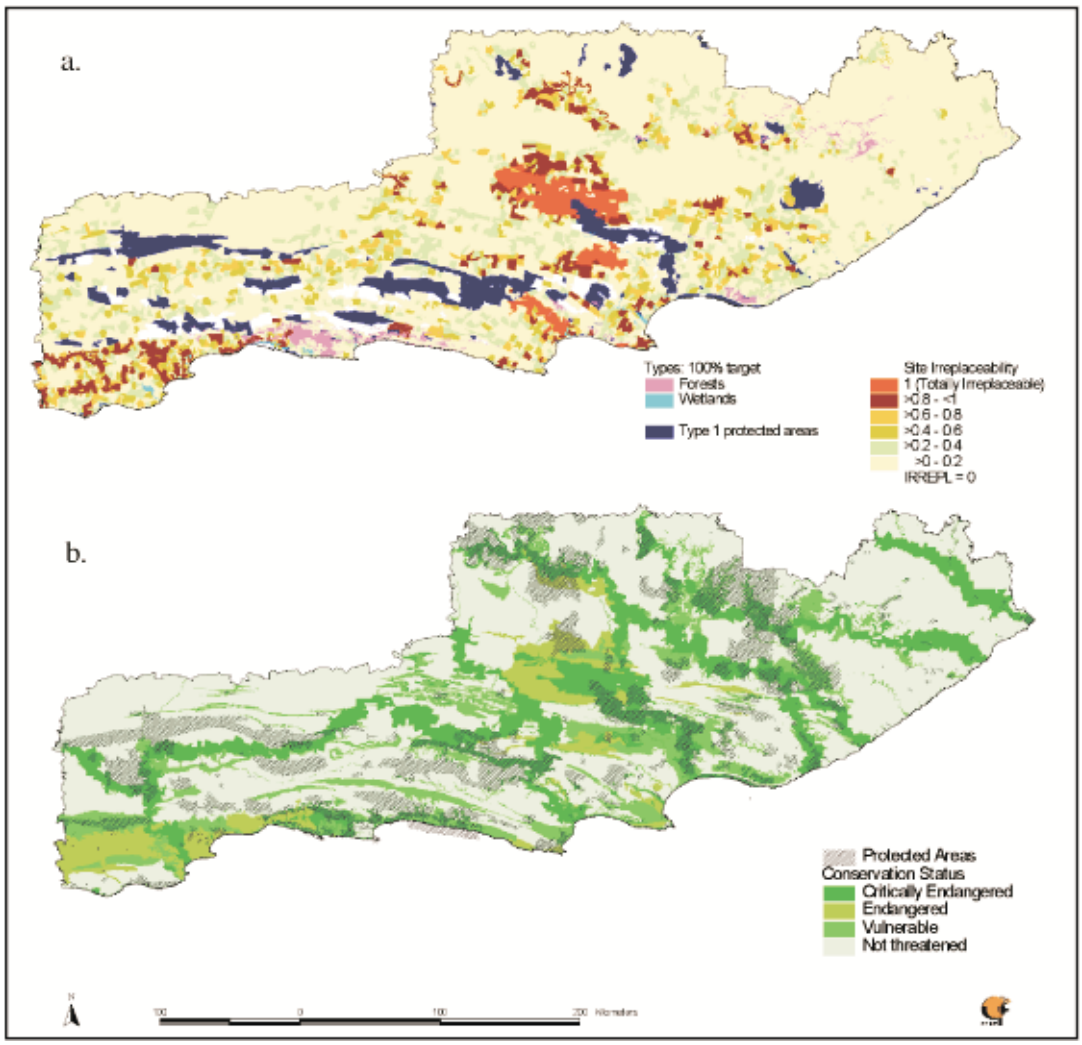


Figure 18: *The STEP conservation assessment produced an irreplaceability map based on targets for vegetation types, shown in (a). This map was built on and interpreted, to provide a conservation priority map of the region, shown in (b). A handbook for municipalities is available to help them interpret the map specifically with regard to land-use planning and decision-making.*

in cases where options for meeting targets remain.
The STEP project developed innovative new products that presented mega-conservancy network corridors and conservation status of land classes rather than an irreplaceability map as the outcome of the conservation assessment (Figure 18). In the Cape Lowlands Renosterveld project, the conservation assessment team worked with regional ecologists from the conservation agency to develop a long-term spatial conservation vision, building on the results of the systematic conservation assessment (Figure 17).

We still have much to learn about who to involve and how to manage the process of building on conservation options maps to produce end-user products. We expect that as different projects explore different methods over the next several years, important lessons will be captured and methodological advances made.

"We still have much to learn about the process of getting from a map of conservation options to an end-user product. We need to explore different methods and capture lessons."

It is important to allocate resources (both time and budget) to the task of interpreting the conservation options map, and to include this task in the workplan of the conservation assessment team. In addition to the conservation assessment team, it may involve other roleplayers in the conservation planning initiative, such as conservation agency staff and possibly key people from other socio-economic sectors in the region.

"Time and budget need to be allocated to the task of interpreting irreplaceability maps and developing effective end-user products. This should form part of the work of the conservation assessment team."

7. FROM END-USER PRODUCT TO ACTION:
MAINSTREAMING BIODIVERSITY PRIORITIES

Even the best maps and guidelines do not sell themselves or lead automatically to action. A major lesson we have learnt is that the biodiversity priorities that emerge from conservation planning need to be actively mainstreamed. By mainstreaming, we mean incorporating biodiversity priorities into the policies, decisions and actions of a diverse range of people and organisations in various sectors. Ideally, we want all land-users and people who make decisions about land-use to be aware of spatial biodiversity priorities, and to take these into account in their actions, so that we are able to meet and maintain conservation targets.

It is helpful to distinguish between mainstreaming at the policy level, and mainstreaming at the level of day-to-day decisions and action. High-level buy-in to a set of biodiversity priorities from politicians, senior officials and NGO leadership, does not necessarily mean that biodiversity priorities will be infused throughout the organisations or departments in question. We need to address mainstreaming at both levels – the policy level and the ground level. Mainstreaming at the policy level can enable mainstreaming at the ground level, but is no guarantee that biodiversity priorities will be reflected in day-to-day decisions and actions.

"Mainstreaming is achieved when biodiversity priorities are incorporated into the policies, decisions and actions of a diverse range of people and organisations in various sectors, so that we are able to meet and maintain conservation targets."

In this chapter we look at how a conservation planning initiative can lay the basis for effective mainstreaming of biodiversity priorities. We distinguish between two main groups in our discussion about mainstreaming:

- The conservation sector (people and organisations whose core business is conservation, such as public sector conservation agencies and conservation NGOs);
- Other sectors (people and organisations whose core business is not biodiversity conservation, such as the agricultural sector, the tourism sector, the mining sector, urban and regional planners, environmental assessment practitioners, and the educational sector, to mention a few).

MAINSTREAMING WITHIN THE CONSERVATION SECTOR

Conservation priorities need to be mainstreamed within conservation agencies and NGOs working in the biodiversity conservation sector. This may sound obvious, but should not be taken for granted. As we discussed in Chapter 2, conservation action has not always been driven by biodiversity priorities, resulting in unrepresentative protected area systems that do not effectively conserve biodiversity. Systematic conservation planning gives us the tools to overcome this problem, but does not guarantee that conservation agencies will take up those tools and work with them, both on and off formal reserves.

We have discussed in Chapters 3 and 4 the need to involve conservation implementing agencies in the conservation planning initiative, ideally as part of the conservation assessment team. This is one powerful step towards mainstreaming the outcomes of the conservation assessment in the agency. The next step is infusing spatial biodiversity priorities throughout the work of the agency, rather than having them in the minds of one or two people or limited to a single division of the organisation.

In order for the strategic spatial conservation priorities identified in a conservation assessment exercise to guide the work of the conservation agency, they have to be integrated into management plans and day-to-day operations. This can be a challenge. It is easy for the day-to-day work of conservation officials, who may face severe resource constraints, to end up being reactive and crisis-driven, rather than guided by long-term strategic biodiversity priorities. A range of factors other than biodiversity per se, such as landowner attitudes and immediate opportunities and pressures, clearly need to be taken into account in deciding where and how to work. However, if there is no guiding vision based on biodiversity priorities, the work of a conservation agency runs the risk of being purely reactive and based on responding to immediate concerns as they present themselves.

"Conservation action should be guided by a combination of conservation assessment outcomes and implementation opportunities and constraints, such as landowner willingness and socio-economic pressures and opportunities. If the day-to-day work of conservation agencies is not guided by a long-term conservation vision based on spatial biodiversity priorities, it can end up being reactive, unfocused and non-strategic."

An example from the Cape lowlands illustrates how a conservation vision and action plan can be established based on a systematic conservation assessment. The Cape Lowlands Renosterveld project involved regional ecologists in the conservation agency in developing a twenty-year conservation vision based on the systematic conservation assessment outcomes. This conservation vision was then discussed with on-the-ground managers and extension officers in the area, who developed a five-year action plan based on the twenty-year vision together with their knowledge of local factors such as landowner willingness, and an assessment of their own capacity and ability to reach landowners in a five-year period.

Conservation NGOs, just like public sector conservation agencies, face the challenge of not simply reacting to immediate concerns as they present themselves, including donor agendas and fundable issues of the day. While these immediate concerns are certainly factors to take into account, it is important to have a strategic long-term biodiversity vision that can form a backdrop for day-to-day decisions in order to retain strategic focus and to be effective. A conservation planning initiative can provide a framework for the long-term vision of different conservation NGOs working in an area, contributing to synergy and complementarity between the work of different organisations. Involving conservation NGOs in the conservation planning initiative is crucial if the conservation plan is to play this role.

MAINSTREAMING IN OTHER SECTORS

Mainstreaming biodiversity conservation priorities across multiple sectors is a huge topic, given the variety of sectors and contexts involved. Here we focus on how the conservation planning process can lay the basis for mainstreaming in other sectors. We refer readers to a recent edited volume, "Mainstreaming Biodiversity in Development: Case Studies from South Africa",[19] for further exploration of prerequisites, stimuli and mechanisms for mainstreaming biodiversity in different sectors.

Conservation action should include working with landowners and land-use decision-makers in all sectors, particularly sectors that are major land-users in a region, to encourage policies, land-use decisions and land-management practices that protect biodiversity in priority areas. A whole host of factors is important for achieving this, many of which are context specific. Nevertheless, we have extracted two key lessons that can contribute to success:

- Involving stakeholders as equal partners in the development of a conservation strategy and action plan, lays a foundation for effective mainstreaming.
- Successful outcomes on the ground require champions who are involved in both the planning phase and the implementation phase.

INVOLVING STAKEHOLDERS AS EQUAL PARTNERS

Mainstreaming conservation priorities across multiple sectors is a long-term endeavour that cannot be fully accomplished *during* the planning phase of a conservation planning initiative. However, the planning phase needs to lay the basis for this endeavour.

We have stressed that conservation planning should involve conservation assessment *and* the development of an implementation strategy and action plan. Identifying sectors that are major land-users in the area, and inviting representatives from those sectors to participate as equal partners in developing the implementation strategy and action plan, goes a long way to laying the basis for effective mainstreaming.

In SKEP, 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

19. Pierce, S.M., Cowling, R.M., Sandwith, T & MacKinnon, K. (eds.) 2002. *Mainstreaming Biodiversity in Development: Case Studies from South Africa*. Washington, DC: The World Bank Environment Department.

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 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.

On the Agulhas Plain in the Cape Floristic Region, people and organisations outside the formal conservation sector were involved in the development of a strategy and action plan for conservation in the region, as part of the Agulhas Biodiversity Initiative. The private sector, including the indigenous flower industry, a local tourism resort and the agricultural sector, played a crucial role. The involvement of the agricultural sector is particularly significant – for the first time in this region, sectors traditionally regarded as having opposing goals are actually working as partners towards the same goal. Cross-sectoral collaboration has yielded multiple socio-economic benefits, including job creation in the flower and tourism industries, together with increased protection of biodiversity in priority areas.

"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 biodiversity conservation in priority areas."

CONTINUOUS PRESSURE AND INVOLVEMENT BY CHAMPIONS IN THE PLANNING AND IMPLEMENTATION PHASES

Involving stakeholders in developing the conservation implementation strategy and action plan is one part of laying the basis for mainstreaming. An additional way is to make sure that there is continuity between those leading the planning initiative and those leading its subsequent implementation. At least one or two people who were centrally involved in the conservation planning initiative should be centrally involved in its implementation. These people need to play the role of champions, who understand the vision established in the planning phase and are committed to finding a way to implement it. Successful outcomes on the ground require continuous pressure and involvement. Champions need tenacity and leadership, and an ability to build capacity in a broad range of individuals and organisations to take mainstreaming forward.

An implication of this lesson is that we should think carefully about how and by whom new conservation planning initiatives are undertaken. It does not make sense to bring in a consulting team entirely from outside the region, to conduct the conservation assessment, hold workshops with local stakeholders to develop an implementation strategy and action plan, and then leave again. There should be at least one locally based champion intimately involved in the conservation planning phase who is able to champion implementation as well. This may be someone from a local or regional conservation agency or conservation NGO.

Mainstreaming requires more than a once-off workshop or training session. It requires ongoing informal and formal interaction with a range of local and regional stakeholders over a period of time, and cannot be led effectively from outside the region.

"Successful outcomes on the ground require continuous pressure and involvement. At least one locally based champion needs to be involved in the conservation planning initiative and in subsequent implementation of the strategy and action plan."

In KwaZulu-Natal, the provincial conservation agency has been instrumental in mainstreaming biodiversity priorities that emerged from the systematic conservation assessment. These priorities have been incorporated in the planning and implementation strategies of other provincial departments, national programmes and municipalities, especially in natural resource management and land-use decision-making. The fact that a senior member of the provincial conservation agency was centrally involved in the conservation planning initiative *and* in subsequent mainstreaming efforts with other departments and programmes was a key ingredient in this success.

On the Cape Flats within metropolitan Cape Town, a key success factor in getting a long-term conservation project off the ground was continuity between the planning and implementation phase, in the form of an individual champion from a local NGO. It took three years for this person to build capacity in other partner organisations to take forward a self-sustaining programme based on the results of the conservation assessment.

The STEP project included the development of a handbook for municipalities to guide their use of the conservation planning products, and workshops to introduce these materials to municipal officials. One-on-one meetings with municipal planners have given insight into the challenges faced by resource-constrained municipalities, especially in predominantly rural areas. This has highlighted the need for post-workshop follow up and further involvement. Ongoing one-on-one support to planners and other officials using conservation planning products is required to ensure mainstreaming of biodiversity priorities in municipal land-use planning and decision-making.

Many South African conservation planning initiatives are now moving from the planning phase into the implementation phase. Different approaches to mainstreaming the results of conservation plans are being explored in different programmes in different regions, and we are certain that valuable lessons will emerge from these. Early indications are that success factors in mainstreaming include committed individuals and NGOs, flexible funders who are willing to take calculated risks and try new models, using projects rather than structures to drive mainstreaming, building effective cross-sectoral partnerships, and actively seeking and highlighting opportunities to link biodiversity to socio-economic gains such as job creation.

CONCLUDING COMMENTS

The South African experience is that systematic conservation planning provides a powerful platform for mainstreaming biodiversity across a range of sectors. By adhering to the principles of systematic conservation planning, placing conservation assessment in an operational framework that involves conservation agencies and other stakeholders, interpreting the scientific results for a wide audience of stakeholders, and following up with ongoing work in innovative cross-sectoral partnerships, we can achieve real integration of biodiversity priorities into the policies, programmes and day-to-day work of other sectors. We still have much to learn. Given the rate at which conservation planning is evolving, and the successful transition of many initiatives from planning into implementation, we believe that many of the lessons presented throughout this booklet will soon be taken for granted, and hope to have a new set of lessons to report on in just a few years time.

FURTHER READING AND USEFUL CONTACTS

There is a wealth of formal literature on conservation planning in scientific journals, including the special issue of Biological Conservation (volume 112, July/August 2003) on conservation planning in the Cape Floristic Region. In addition, the following reports give details about some of the conservation assessments referred to in this booklet:

C.A.P.E. Technical Report

- Cowling, R.M., Pressey, R.L., Lombard, A.T., Heijnis, C.E., Richardson, D.M. & Cole, N. 1999. Framework for a Conservation Plan for the Cape Floristic Region. Institute for Plant Conservation, University of Cape Town.
  Available at ***www.panda.org.za*** (under Projects).

SKEP Technical Report

- Driver, A., Desmet, P., Rouget, M., Cowling, R.M., Maze, K. 2003. Succulent Karoo Ecosystem Plan: Biodiversity Component Technical Report. Cape Conservation Unit Report No CCU 1/03, Botanical Society of South Africa.
- Available at ***www.botanicalsociety.org.za/ccu*** (under Downloads).
  Other SKEP reports and documents, including the SKEP Twenty Year Strategy, are available at ***www.dlist.org*** (in the SKEP kiosk).

STEP Technical Report

- Cowling R.M., Lombard A.T., Rouget M., Kerley G.I.H., Wolf T., Sims-Castley R., Knight A., Vlok J.H.J., Pierce S.M., Boshoff A.F. & Wilson, S.L. 2003. A Conservation Plan for the Subtropical Thicket Biome. Terestrial Ecology Research Unit, University of Port Elizabeth. TERU Report 43.
- Available at ***www.zoo.upe.ac.za.*** Other STEP reports and documents are available on the same site.

Agulhas Plain Conservation Plan Technical Report

- Cole, N.S., Lombard, A.T., Cowling, R.M., Euston-Brown, D., Richardson, D.M. & Heijnis, C.E. 2000. Framework for a Conservation Plan for the Agulhas Plain, Cape Floristic Region, South Africa (2nd edition). Institute for Plant Conservation, University of Cape Town.
- Available at ***www.panda.org.za*** (under Projects, together with the C.A.P.E. reports).

Cape Lowlands Renosterveld Plan Technical Report

- Von Hase, A., Rouget, M., Helme, N. & Maze, K. 2003. Conservation Planning in Cape Lowlands Renosterveld: Technical Report. Cape Conservation Unit Report No CCU 2/03, Botanical Society of South Africa.
- Available at ***www.botanicalsociety.org.za/ccu*** from November 2003.

SELECTED WEBSITES

www.biodiversityscience.org (CABS)
www.dlist.org (see SKEP kiosk)
www.botanicalsociety.org.za/ccu
www.kznwildlife.org.za (Ezemvelo KZN Wildlife)
www.capeaction.org.za (C.A.P.E.)
www.parks-sa.co.za (South African National Parks)
www.conservation.org (Conservation International)
www.zoo.upe.ac.za (TERU, STEP)
cpu.uwc.ac.za (CPU)

ORGANISATIONS INVOLVED IN CONSERVATION PLANNING IN SOUTH AFRICA

Biodiversity Conservation Unit, Wildlife and Environment Society of South Africa, Eastern Province region
www.wildlifesociety.org.za
wessaep@iafrica.com

Cape Conservation Unit, Botanical Society of South Africa
www.botanicalsociety.org.za/ccu
paisley@nbict.nbi.ac.za

Conservation Planning Unit, Western Cape Nature Conservation Board
cpu.uwc.az.za
cpu_help@nbict.nbi.ac.za

Ezemvelo KwaZulu-Natal Wildlife
www.kznwildlife.org.za

National Botanical Institute (Biodiversity Directorate)
www.nbi.ac.za

Terrestrial Ecology Research Unit, University of Port Elizabeth
www.zoo.upe.ac.za

GLOSSARY

This glossary does not give a comprehensive list of all technical and scientific terms used in the booklet, but focuses on terms that may be used differently by different people in different contexts.

Biodiversity
All genes, species and ecological communities (biodiversity pattern), and the ecological and evolutionary processes that sustain them.

Biodiversity feature
An element of biodiversity for which it is possible to set a quantitative conservation target, for example a vegetation type, a species, or the spatial component of an ecological process.

Bioregional planning
See text block on page 3.

Conservancy
A voluntary arrangement between a group of private landowners who own property in the same area, often adjacent to each other, to co-operate to protect an aspect of the local landscape and its biodiversity.

Conservation action
Conservation action includes but is not limited to the establishment or expansion of protected areas. Conservation action should include engaging with all major landowners and land-users across a range of socio-economic sectors, to increase awareness of priority areas for meeting conservation targets, and to ensure that land management and land-use decisions in these priority areas support biodiversity conservation.

Conservation assessment
The development of spatial data layers and the spatial analysis undertaken to identify options for meeting conservation targets for a range of biodiversity features. Conservation assessment should include the interpretation of the results of this analysis for a wide range of stakeholders.

Conservation planning
Planning at a range of spatial scales that aims to identify priority areas for biodiversity conservation, taking into account patterns of biodiversity (the principle of representation) and the ecological and evolutionary processes that sustain them (the principle of persistence). Conservation planning involves **conservation assessment** plus the development of an **implementation strategy and action plan**.

Conservation targets
Quantitative targets that tell us how much of each biodiversity feature needs to be conserved in order to conserve a representative sample of biodiversity pattern and key ecological and evolutionary processes. Targets are expressed as, for example, numbers of hectares of a land class.

Ecological and evolutionary processes
The processes that operate to maintain and generate biodiversity. Ecological processes operate over relatively short time scales, while evolutionary processes operate over much longer time scales. Conservation assessments often include mapping and setting targets for the spatial components of these processes, namely the areas of land or water required to ensure their continued functioning.

Ecoregional planning
See text block on page 3.

Habitat loss
Loss of natural habitat, also referred to by conservation planners as transformation. In some cases habitat loss is irreversible, meaning that the natural habitat can never be restored, for example as a result of urban development, crop agriculture and most forms of mining. In other cases, the habitat loss is reversible, meaning that the natural habitat can be restored. For example, overgrazed veld in some ecosystems can recover if the grazers are removed. Habitat loss is the single biggest cause of biodiversity loss in South Africa and the rest of the world. Halting biodiversity loss depends on slowing the rate of habitat loss, and avoiding habitat loss in areas that are important for achieving conservation targets.

Protected area
The IUCN defines a protected area as: an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources, and managed through legal or other effective means.
This implies that a protected area is an area of natural or semi-natural habitat with some form of conservation management that is secure for the foreseeable future. A protected area does not have to be a formal fenced-off reserve, and does not need to be owned by the state.

Spatial component of an ecological or evolutionary process
See ecological and evolutionary processes.

Transformation
See habitat loss.