



***Darwin Initiative for the Survival of Species
Final Report***

*Transnational conservation planning in the Maputaland
ecoregion of southern Africa*

*Durrell Institute of Conservation & Ecology,
University of Kent*

1. Darwin Project Information

Project Reference No.	162/12/006
Project title	Transnational conservation planning in the Maputaland ecoregion of southern Africa.
Countries	Mozambique, South Africa and Swaziland
UK Contractor	Durrell Institute of Conservation and Ecology (DICE), University of Kent
Partner Organisations	Ezemvelo KwaZulu-Natal Wildlife
Darwin Grant Value	£131,185
Start/End date	1st June 2003/ 31st March 2006
Project website	http://www.mosaic-conservation.org/maputaland
Authors, date	Dr Robert Smith and Professor Nigel Leader-Williams 1 st February 2007

2. Project Background/Rationale

The location of the project and the problem it addressed

The Maputaland centre of endemism is an area of approximately 17,000 km² that covers parts of Mozambique, South Africa and Swaziland. For the purpose of this project, the boundaries of Maputaland are set by the Lubombo Mountains to the west, the Indian Ocean to the east, the Mtubatuba-St Lucia road to the south and the Namaacha-Maputo road to the north.

Maputaland is internationally recognised for its conservation value, as it contains large numbers of endemic plant and animal species and one World Heritage Site. Maputaland is also home to a great diversity of terrestrial, freshwater and marine habitats, as well as large populations of charismatic species such as the African elephant and black rhino. Unfortunately, Maputaland's unique biodiversity is increasingly threatened by the spread of subsistence agriculture and over-harvesting of natural resources. As a result, there is a need for a conservation planning system to underpin the Trilateral Protocol signed in 2000 to create a Transfrontier Conservation Area (TFCA), which recognises ecotourism and natural resource harvesting as the optimal forms of land use.

Existing planning projects, however, are hampered by a lack of capacity and suitable data and, in some instances, an *ad hoc* approach that does not involve the relevant stakeholders. This project aimed to overcome these problems by designing a relevant conservation planning system for Maputaland and working with stakeholders to build capacity and to ensure that future land-use plans in the region are designed to maintain biodiversity without negatively affecting the livelihoods of local communities.

Project identification and development

This project developed from a long-term collaboration between DICE and Ezemvelo KwaZulu-Natal Wildlife (EKZNW). The Project Officer had worked with EKZNW since 1996 and based on their request, had completed a preliminary conservation planning project in the South African section of Maputaland in 2001. We agreed that there was an urgent need for a transnational conservation planning system, both to ensure that the whole region was adequately conserved and to inform the newly developed TFCA initiative. In addition, DICE had worked with the University of Swaziland (UNISWA) and the Swaziland National Trust Commission (SNTC) since 1999 and they also supported our proposed project. Thus, it was only our future Mozambique

partners who had not worked with DICE prior to developing the proposal for this project.

3. Project Summary

Purpose and objectives of the project

The purpose of the project was "To produce a conservation planning system for the Maputaland ecoregion, build capacity to ensure its continued utilisation, and encourage the use of this methodology in other developing countries". Our original objectives, which were not modified during the project period, were to produce a number of outputs, as described below:

1. A conservation planning system for Maputaland that will aid stakeholders in producing relevant land-use policies.
2. Increased tri-national capacity to use the planning system and software.
3. A report providing information on future planning scenarios based on stakeholder opinions.
4. Strengthened links between the stakeholders involved in conservation planning in Maputaland.
5. A user-friendly conservation planning software & tutorial.
6. Publications and presentations that illustrate the role of conservation planning in maintaining biodiversity in Maputaland and more widely.

In terms of supporting the CBD, the project focussed on: *in-situ conservation* (Article 8) by producing the transnational Maputaland conservation planning system to guide the development of a protected area (PA) network; *research and training* (Article 12) to ensure that system continues to be used; *access to and transfer of technology* (Article 16) by producing user-friendly conservation planning software, and; *exchange of information* (Article 17) by producing a range of GIS data for incorporation into the Maputaland conservation planning system.

Meeting the objectives

1) The Maputaland conservation planning system

The Maputaland Conservation Planning System (CPS) has been successfully completed and contains spatial data on the distributions of 44 landcover types, 20 vertebrate species, 13 invertebrate species, 20 plant species and 13 ecological processes. The system also includes target data on the amount of each of these conservation features that needs to be conserved, as well as spatial data on risk of agricultural transformation and the potential profitability of game ranching.

2) Increased tri-national conservation planning capacity

We increased conservation planning capacity in the region in two ways. First, one Mozambican and one South African national undertook the MSc in Conservation Biology at DICE. Second, we ran six training workshops on systematic conservation planning for our partners and these were attended by 46 people from 15 organisations, including the three government conservation agencies (Appendix VI).

3) The Maputaland Conservation Assessment report

The Maputaland CPS was used to run the first Maputaland Conservation Assessment (MCA), which designed a conservation landscape consisting of the existing PAs, new core areas and linkages to maintain connectivity. This landscape was designed in collaboration with our project partners and was designed to meet the biodiversity targets specified in the CPS, whilst minimising impacts on local livelihoods. A

description of the Maputaland CPS and the MCA have been published in the report entitled "The Maputaland Conservation Planning System and Conservation Assessment" that was distributed to our partners and other interested groups. Maps of the landscape in GIS format were also produced and made available on CD-ROM.

4) Strengthened links between the stakeholders involved in conservation planning

The Lubombo TFCA initiative had already developed a number of links between the implementation stakeholders in Maputaland, so we focussed on two main activities: strengthening links between the scientific community in the region as part of the process for identifying the conservation features; and setting the representation targets for the Maputaland CPS. These activities were mainly addressed through running a three-day workshop in Maputo in February 2006, which was attended by conservation experts from all three range states. We feel that these links need to be strengthened further and this will be achieved over the next three years as part of a follow-on project that is being funded by the World Bank.

5) The CLUZ conservation planning software

A program named CLUZ was produced to act as a user-friendly GIS interface for the MARXAN conservation planning software and to allow on-screen design of protected area networks and ecological networks. CLUZ has been widely adopted by the conservation planning community: since July 2004, CLUZ has been downloaded by 556 people from 72 countries (Appendix V). The project also produced a CLUZ website, tutorial and manual, as well as a website providing a step-by-step guide to conservation planning.

6) Publications and presentations on conservation planning

Two articles have been published in peer reviewed journals that describe the importance of the systematic conservation planning approach and its use in Maputaland. The project has also been publicised through the creation of one website, three posters and three newsletters. Five presentations about the project were given at conservation conferences in Brazil, South Africa and the United States of America.

Additional accomplishments

The development of CLUZ has been welcomed by the global conservation planning community and the Project Officer was invited to workshops in Brazil, Denmark, South Africa and the United Kingdom to teach how to use this software for systematic conservation planning.

Bruno Nhancale, the Mozambican national who completed his MSc in Conservation Biology at DICE as part of our project, has received funding from the African Wildlife Foundation and the University of Kent to undertake a PhD project that will further develop the Maputaland CPS.

We have received funding from the World Bank to work with the Government of Mozambique for the next three years to build on the Maputaland CPS and develop new planning systems for the Greater Limpopo and Chimanimani TFCAs.

4. Scientific, Training, and Technical Assessment

Research

The research for this project was carried out in two ways. First, seven DICE MSc students carried out research as part of their six-month dissertation research projects. Their work can be grouped into the following topics: assessing the feasibility of community-based conservation projects in Maputaland; measuring and modelling the spatial patterns of plant resource in Maputaland, large mammal conservation and its role in the development of Maputaland's protected area network.

The methodologies used by these students are fully described in their dissertations. All seven projects were developed with our project partners in Mozambique and South Africa. Each dissertation was reviewed by an external examiner as part of the DICE MSc in Conservation Biology review system and all of the students received a Merit or Distinction for their project.

Second, research was carried out by the Project Officer to underpin the objectives of the Maputaland Conservation Planning System and the Maputaland Conservation Assessment. This research was developed from the literature on existing projects and then modified and improved through discussions with our project partners. The methodology and results of this work are fully described in the report entitled "The Maputaland Conservation Planning System and Conservation Assessment". We also published two articles in peer-reviewed journals to ensure the scientific credentials of our Maputaland project. The first article presented the results from a preliminary conservation assessment of the South African section of Maputaland, and was published in *Oryx*. The second article was co-authored by a group of conservation planners, and described how the systematic conservation planning approach is the most appropriate for designing ecological networks, and was published in *BioScience*.

Training and capacity building

1) DICE MSc students

One South African and one Mozambican national undertook the MSc in Conservation Biology at DICE as part of the Darwin project. Their training involved a six-month taught course and a six-month research dissertation.

Petros Ngwenya was nominated for training by our project partner, EKZMW, because he worked in their Biodiversity Division and because gaining an MSc would benefit both himself and the transformation process within EKZMW. Petros' research project developed a feasibility study for creating a community conservation area to border with Mkhuzwe Game Reserve in the South African section of Maputaland. Petros gained merit marks in both his coursework and dissertation, and was awarded his MSc with a Merit overall.

Bruno Nhancale was one of several suitable candidates suggested by our project partners in Mozambique, but he was selected based on his previous work in Maputaland for a local conservation NGO. Bruno's research project focussed on modelling future human-elephant conflict in Maputaland, Mozambique. Bruno also gained a merit in his coursework, but gained a distinction in his dissertation, and was awarded an MSc with Merit overall. Very significantly, Bruno Nhancale received The Maurice Swingland Prize, which is awarded annually to the best postgraduate student taught by DICE in its postgraduate programmes involving coursework and dissertation.

2) CLUZ and MARXAN training courses

The Project Officer ran six one- or two-day training courses on using CLUZ and MARXAN for systematic conservation planning for project partners. These were held at the University of Swaziland in Kwaluseni, Universidade Eduardo Mondlane in Maputo, the EKZMW head office in Pietermaritzburg, at the University of KwaZulu-Natal in Pietermaritzburg, in Groenvlei in the Eastern Cape and following our conservation assessment meeting in Maputo. A total of 46 people from 15 organisations attended these courses, including the three government conservation agencies (Appendix VI).

The Project Officer also ran a number of courses on conservation planning and these were for: the DICE MSc students each year for three years; attendees of the Cambridge Student Conference for Conservation Science (SCCS) each year for two years; students at the Society for Conservation Biology meeting in Brasilia in 2005, and; attendees of the 2006 South African Biodiversity Implementation Forum in Blydepoort. Most of these courses focussed on using CLUZ and MARXAN for

conservation planning apart from the SCCS workshops, which consisted of a more general introduction to systematic conservation planning.

3) On-line training for CLUZ

The project produced a CLUZ guide and CLUZ tutorial that were downloaded by the 556 people who registered for the software. The guide described all of the CLUZ modules and the software consisted of three exercises that explained how to run CLUZ, how to set up the data and how to run the software, while specifying minimum viable patch sizes for key species. The project also produced the CLUZ and step-by-step assessment guide websites, which explained the theory behind the software and gave detailed advice on how to undertake a conservation assessment.

4) Training of field assistants

Two of the DICE MSc projects involved the students working with local community members to help collect data and this involved a training element. Nerissa Chao trained five people from the Mathenjwa community to carry out questionnaire surveys and input the data into a computer. Petros Ngwenya trained seven members of the KwaJobe community to carry out questionnaire surveys and use GPS units. All of the people were employed based on discussions with the local tribal authorities.

5. Project Impacts

Project purpose

The Maputaland CPS and MCA were designed and developed in collaboration with our main partners, and our project provided training to help ensure that our partners will continue to use and update the CPS in the future. Therefore, we are confident that these achievements will lead to the long-term project purpose of producing a conservation planning system for Maputaland and building capacity to ensure its continued utilisation.

Our confidence is supported by the fact that the district council that is responsible for the South Africa section of Maputaland has already agreed to adopt our results from the MCA. This is in addition to the support that has already been shown by the Lubombo TFCA initiative and the Peace Parks Foundation, who have already requested the results of the MCA to help inform their extensive conservation activities in the region. Other supporting evidence comes from the fact that EKZNW are now using CLUZ to develop their KwaZulu-Natal conservation assessment and the Government of Mozambique is currently working with DICE to develop new planning systems for the Greater Limpopo and Chimanimani TFCAs.

The other main part of our project purpose was to encourage the use of the systematic conservation planning approach in other developing countries. We did this by producing CLUZ, together with the CLUZ websites, manual and tutorial, and by running training workshops within Southern Africa and at international meetings in Brazil and the United Kingdom. The success of this approach is illustrated by the fact that 248 people from 16 African, 16 Latin American and Caribbean, 12 Asian and 5 Former Soviet Union countries have registered as CLUZ users.

The production of the MCA has helped all three Maputaland range states meet their obligations under the CBD, as this has produced a report to help guide the establishment of an ecological network that will include a PA system and associated linkages to regulate biological resources and promote the protection of habitats.

Capacity building

The Maputaland project had a major capacity building component and this consisted of four main elements.

1) DICE MSc students

The two students who undertook the MSc in Conservation Biology at DICE returned to their home countries in 2005. Petros Ngwenya resumed working for EKZWN's Biodiversity Division in South Africa and it is expected that he will continue in this role before being promoted to a Regional Ecologist post within the same organisation. Bruno Nhancale returned to work for the NGO Fórum para Natureza em Perigo on his return to Mozambique but in 2006 he joined another NGO, Centro Terra Viva, as the Director of their Conservation Programme. In mid 2006 he was awarded scholarships by the African Wildlife Foundation and the University of Kent to undertake a PhD at DICE, which he started in 2007. His PhD thesis is entitled "Strengthening and mainstreaming the Maputaland systematic conservation planning system" and so his completion of the MSc programme will be directly relevant to his new studies.

2) CLUZ and MARXAN training courses

A large number of people undertook the CLUZ and MARXAN training courses, but it is likely that only a small proportion of course participants will use the software in the future. However, most of the participants will use the outputs from conservation planning projects, so our courses provided valuable background information for those conservation professionals who attended. We estimate that five people who attended our courses in Southern African will use CLUZ in the future, which is the majority of the people directly involved with using conservation planning software. MARXAN is now globally recognised as the most appropriate conservation planning software and so all future conservation planning projects in Southern Africa are likely to be based on CLUZ and MARXAN.

3) On-line training for CLUZ

The on-line training was made available on the CLUZ website to ensure that this software was used by the global conservation planning community. We have received feedback via e-mail that many people have completed the CLUZ tutorial.

4) Field assistants

A number of research students from South Africa and elsewhere carry out field research in Maputaland, so it is likely that the field assistants who were trained as part of the DICE MSc projects will use their skills in the future.

Collaborations and social impact

Our collaborations with our project partners have been beneficial in a number of ways. First, we have produced the Maputaland CPS and MCA. Second, EKZWN benefited from one of their staff members completing the MSc in Conservation Biology, which has strengthened their capacity. Third, we have built conservation planning capacity within our main government partners, as well as with local NGOs and universities in the three range states. Fourth, we have collaborated with the South African conservation planning community, both directly with the Mpumalanga Parks Board, and indirectly by providing training and advice at the South African Biodiversity Implementation Forum. Fifth, the DICE MSc students carried out research that was used by our project but also provided other useful information for EKZWN and The Wildlands Conservation Trust.

Our project partners have already formed a number of collaborative bodies as part of the Lubombo TFCA, but our project created new links between the biodiversity experts working in the three range states.

The MCA will inform various local initiatives that seek to conserve biodiversity and reduce poverty through the creation of ecotourism and sustainable harvesting projects. Therefore, our project had no direct social impacts but our outputs can be used to design a conservation landscape that maintains the region's biodiversity and helps improve local livelihoods.

6. Project Outputs

Changes to outputs

1) Producing the manual on identifying focal species and biodiversity elements

We decided that producing a training manual describing the methodology for identifying focal species and biodiversity elements would not be the best way to disseminate the information. Instead, we created a website that contains these details, together with information on a range of other relevant issues. We also described the specifics of how the species and other biodiversity elements were selected for the Maputaland CPS in the associated report.

2) Focal species workshops

It was difficult to arrange several workshops to decide the focal species to be used in the Maputaland CPS. Instead, we developed the list by e-mail and by meeting with individual experts and finalised the list during a workshop that was attended by experts from all three Maputaland range states.

3) Producing the cultural site and alien plant data.

Our project partners suggested that it would be better to include other types of GIS data in the Maputaland CPS, instead of the GIS data on the distribution of important cultural sites and alien plant species that we originally suggested. More specifically, our partners thought that the cultural sites and alien plant species data could not be recorded accurately at a suitable spatial scale. In addition, they felt that the risk of agricultural transformation map would act as an adequate surrogate for areas where alien plant species are likely to be found.

4) Training in systematic conservation planning

Our original plan was to focus on training university lecturers to teach systematic conservation planning to their students. However, it became clear that it would be more appropriate to train a wider group of conservation professionals because demand was not limited to the university sectors. Therefore, we broadened our approach and also providing training for local consultants and people working for conservation agencies outside Maputaland. Nevertheless, six university lecturers were still included in this wider group of trainees.

5) DICE MSc students field research

Our original intention was that the two DICE MSc students carried out desk-based research projects. However, we decided it would be more appropriate for them to carry out multi-disciplinary projects back in their home country. Therefore, both students collected social and biological data in the field, so learning a number of new and relevant skills.

6) Manuscripts for peer-reviewed journals

Three manuscripts were submitted to peer-reviewed journals and two were rejected. However, one entitled "Conservation planning and viability: problems associated with identifying priority sites in Swaziland using species list data" was not accepted. We intend to resubmit this article to the *Southern African Journal of Zoology* within the next 6 months. We also intend to submit a manuscript to *Conservation Biology* based on the overall MCA within the next 6 months.

Additional outputs

1) Additional teaching and training

The project involved a number of additional teaching and training activities and the most significant were: workshops to train the DICE MSc students in conservation planning and using CLUZ; workshops to teach systematic conservation planning to participants at the Student Conference on Conservation Science in Cambridge; teaching student participants as part of the short course on conservation planning

that preceded the Society for Conservation Biology annual meeting in Brasilia, and; workshops to train participants at the South African Biodiversity Implementation Forum.

2) Additional presentations and publicity

The project was publicised by producing three additional newsletters and two additional posters. In addition, the Project Officer gave presentations at five meetings and gave one radio interview.

3) Additional research and data collection

The project produce five additional MSc dissertations that were each based on a six month research project. Each of these projects was undertaken by a DICE MSc student and involved six to eight weeks of field work. All of these projects produced results that either fed directly into the Maputaland CPS or provided information that was needed by our project partners in South Africa. This field work was supervised by the Project Officer, who spent an additional 11 weeks in Maputaland to help achieve the additional training and research outputs.

The project produced two additional GIS databases. One of these described the ecological zones of Maputaland and one produced a potential game ranch profitability map for the region.

Project dissemination

All of our project outputs are available either from the project website or are contained on the project CD-ROM. Fifty of the project CD-ROM and 125 copies of the report entitled "The Maputaland Conservation Planning System and Conservation Assessment" are being distributed amongst our project partners and the conservation community in the three Maputaland states and elsewhere. Our final newsletters also provided information about our project and gave contact details so that other groups can either download our project outputs or request a copy of the project CD-ROM from the Project Officer. It is anticipated that very few additional people will want copies of the CD-ROM, so the cost of producing and posting this product will be covered by DICE. The project website will continue to provide information and access to our reports and publications.

We will continue to e-mail the people who have downloaded CLUZ from the CLUZ website about new versions of the software and will also use the recently created MARXAN listserver to inform the conservation planning community about our work.

7. Project Expenditure

Details of our budget are given in the table below, which shows that our expenditure varied by less than +/- 10% for each budget line.

Cost category	Original	Actual	Difference (%)
Rents, rates, heating, lighting, overheads			
Office costs e.g. postage, telephone			
Travel and subsistence			
Printing			
Conferences, seminars etc			
Capital items/equipment			
Other costs			
Salaries			
TOTAL			

8. Project Operation and Partnerships

Involvement with local partners

The original idea for the Maputaland project was suggested by EKZNW and supported by our colleagues at UNISWA and the SNTC. We developed our original project plan together with these partners but input from our Mozambique partners was initially limited to some comments from WWF and the National Directorate of Conservation Areas (DNAC) at the Ministry of Tourism.

The initiation of the project, however, allowed us to strengthen our links in Mozambique and we began to work closely with DNAC, researchers from the Universidade Eduardo Mondlane and the local NGO Fórum para Natureza em Perigo. We also built links with several South African universities, who helped produce the biodiversity data that were included in the conservation planning system. Finally, we built links with the Lubombo TFCA initiative, which is a collaborative project that involves most of our original project partners but also includes a number of local NGOs and local government partners.

As a result, our main project partners at the end of the project were DNAC, SNTC and EKZNW. These organisations were closely involved in the development of the Maputaland CPS and producing the MCA. Our other project partners from local universities, local government and NGOs played a more minor role by helping us to develop the planning system and collect appropriate data.

Collaborations with other projects and institutions

Our project involved collaborations with the Succulent Karoo Ecosystem Programme, the Mpumalanga Parks Board and EKZNW, as these organisations were undertaking similar conservation planning projects in different regions. We also worked with The Wildlands Conservation Trust as part of their project to develop the Usuthu Gorge Conservation Area in central Maputaland. Our project partners included the organisation responsible for biodiversity conservation within all three range states, so we did not deal directly with the Biodiversity Strategy Office.

We worked together with colleagues from The Ecology Centre at the University of Queensland to develop the new version of MARXAN, and they also provided advice during the development of CLUZ.

Maintenance of partnerships

The Maputaland project aimed to inform existing conservation activities within the region, so many of the partnerships are actively maintained through the Lubombo TFCA initiative. Our project did build new links between the scientists working in the three range states and these will be maintained during the next three years as part of our new World Bank funded project. The Lubombo TFCA process involves all relevant stakeholders, including local community groups and the ecotourism and game ranching sector, so we feel that local communities and the private sector will be adequately represented.

9. Monitoring and Evaluation, Lesson learning

Baseline data, milestones and indicators

The Maputaland CPS is designed to contain a range of baseline data that will allow our project partners to measure how well the region's PA network meets the specified targets for the important conservation features. These conservation features act as surrogates of broader biodiversity and consist of 44 landcover types, 20 vertebrate species, 13 invertebrate species and 20 plant species. We also geo-corrected and geo-registered 14 Landsat ETM and ASTER satellite images, which will allow future time-series analyses of habitat loss.

Our milestones consisted of activities belonging to the following groups: website development, software development, workshops, training, field research, producing GIS data, planning reports, and, project monitoring, and completing these activities ensured the success of our project. This success was measured by considering the following purpose indicators, which were listed in our original logical-framework:

Indicator 1: Planning system used in Maputaland to make land-use decisions

The Maputaland CPS was only completed recently and so there have been limited opportunities for our partners to use it to make land-use decisions. However, Umkhanyakude District council, which is responsible for the South Africa section of Maputaland, has already used our MCA results to develop their Biosphere Reserve Project plan. A preliminary Umkhanyakude District conservation assessment that we completed in 2004 was also used by EKZNW to block the development of new *Eucalyptus* plantations in important conservation areas. In addition, DNAC will be working together with DICE to build on our project in Maputaland develop planning systems for two more TFCA projects in Greater Limpopo and Chimanimani.

Indicator 2: Data in planning system continue to be updated

In the medium term, we know that the data in the planning system will continue to be updated, as we have funding from the World Bank, the African Wildlife Foundation and the University of Kent to undertake this work over the next three years. We are also confident that further resources will be provided by our project partners to update the Maputaland CPS in the long term.

Indicator 3: Software downloaded from website and used in other countries

CLUZ has been downloaded by 556 people from 72 countries since it was released in July 2004. We are very happy with this level of uptake and will continue to monitor CLUZ users to ensure that the software remains relevant to the conservation planning community.

Other indicators

We used a number of other indicators to evaluate the sub-components of the project that fed into the major outputs described above. These consisted of: measuring the success of the project website by counting the number of visitors; peer review of scientific articles; external assessment of the two DICE MSc students; external assessment of the five additional MSc dissertations; surveying CLUZ users for the opinions on the software, and; meetings with our project partners to explain progress and discuss results.

Main problems and evaluation

The main problem in this project resulted from our reliance on our project partners to help produce the conservation feature distribution maps. We were fortunate that many of the people working for these organisations have high levels of expertise, but they also had a large number of other commitments that limited the amount of time they had available. Unfortunately, there was no way around this problem as it was important for the credibility of the Maputaland CPS that we included all of these people in the development of the distribution data. The only solution to this problem was for the Project Officer to work for six months beyond his contract period to ensure the production of the CPS and the MCA, which has also resulted in the delay in producing this final report.

Two other smaller problems arose at the beginning of the project. First, there was an initial lack of engagement with potential partners in Mozambique. However, this changed over time and by the second year we had identified the most suitable partners and had begun working closely with them. Second, there was less high-level political support for conservation activities from within the Government of Swaziland, which made it difficult to ensure that SNTC would be given the opportunity to implement the results of the MCA. To overcome this we focussed on providing

support to the Lubombo TFCA process, as this organisation has the political leverage to ensure that Swaziland fulfils its conservation obligations.

With regards to project evaluation, we had originally intended to set up a steering committee for the project. However, this proved very difficult given that our project involved partners for three different countries. Instead, we communicated by e-mail and the Project Officer met with all the partners during each of his visits to Maputaland. We did present our preliminary results to a meeting of the Lubombo TFCA steering committee, which was attended by the main implementation agencies and so these groups were kept informed of our progress. With the recent completion of the Maputaland CPS and MCA, we now plan to hold a workshop in Maputo in June 2007 to present our results and discuss the project with all of our project partners. This will allow our partners to evaluate the project and their feedback will be used to guide our follow-on project that is being funded by the World Bank.

Key lessons

- 1) It is vitally important to design the original concept in close collaboration with the project partners. We knew from the very beginning that our partners needed to fill a specific capacity gap and our project was designed to address this problem. This ensured the continued support for our work and that our outputs had a high impact because by overcoming constraints in the regional conservation process.
- 2) We trained a large number of people in systematic conservation planning but only a few of those people will use those skills frequently enough to keep those skills. However, training the other participants was also important, as it meant that they understood more about the project and felt more engaged with the Maputaland CPS.
- 3) Conservation software must be designed with non-experts in mind, as any perceived difficulty with using a computer system will lead to it being ignored. There are many existing conservation planning programmes, so in our case it was better to produce a user-friendly interface for the best existing package rather than develop a new one. We also ensured that our system does not depend on large amounts of data, so that a range of conservation planners can use this approach and are not dependent on continuous sources of external funding.
- 4) We worked with a large number of project partners and some of them were less engaged at the beginning of the project because they found it difficult to visualise the system that we were producing. In response, we produced a map showing an initial conservation assessment based on existing South African data and this really helped explain our work and galvanise support amongst all our partners.

10. Actions taken in response to annual report reviews

The review of our first annual report asked us to explain the roles of the different stakeholder groups because our project involved a number of organisations and their roles needed clarification. We responded by categorising the groups as either major or minor stakeholders, and describing their roles as supporting the implementation, data collection or advocacy aspects of producing the Maputaland conservation planning system.

11. Darwin Identity

The project publicised the Darwin Initiative through the following outputs:

Websites – three websites described: the Maputaland project; CLUZ, and; a guide to systematic conservation planning. All of these websites have displayed the Darwin Initiative logo.

CLUZ – the CLUZ software prominently displays the Darwin Initiative logo and the logo is also shown on the CLUZ guide and tutorial.

Newsletters - three annual newsletters described the project and were sent to interested groups within the three Maputaland range states and to other interested groups. The newsletters were also available for download from the project website, and displayed the Darwin Initiative logo.

Posters – three posters were produced as part of the project and all of them displayed the Darwin Initiative logo. The first poster showed the results from a preliminary conservation assessment of the South African section of Maputaland. This poster was A4 in size and 100 copies were distributed to project partners and at international meetings and conferences. A copy of the poster was also available for download from the project website. The second poster described the research that underpinned the first poster and this was presented at the 2005 South African Biodiversity Implementation Forum and the 2006 Society for Conservation Biology meeting at San Diego, USA. The third poster was designed to raise local awareness about the conservation value of Maputaland and it was distributed via our local partners to secondary schools, ecotourism offices and local government departments.

Press releases – the Darwin Initiative was mentioned in the press release that we produced on blocking the development of *Eucalyptus* plantations on important conservation areas in South Africa, which was published in the local newspaper, on the University of Kent website and on the Maputaland project website.

Articles and reports – the Darwin Initiative was thanked in the acknowledgements of the two articles that were published in *Oryx* and *Bioscience* and the logo was prominently displayed on the MCA report and the MSc student dissertations.

Talks – the Project Officer gave talks in Brazil, Denmark, Mozambique, South Africa, Swaziland, the United Kingdom and the United States of America about this project to a combined audience of approximately 600 people. The Darwin Initiative logo appeared on all of these presentations and the Darwin Initiative were also thanked for their support. The Principle Investigator has included results from Maputaland on the potential value of game ranching on communal land for plenary and other talks, which also displayed the Darwin Initiative logo.

All of our project partners are aware of the Darwin Initiative because all of our reports and presentations involved thanking the Darwin Initiative for their support and displaying their logo. Most of our partners already knew about the Darwin Initiative but our work has helped strengthen this awareness.

The Maputaland project had a clear identity because of the nature of our work. Our project was designed to fill a specific gap in capacity and expertise and so was seen as being distinct from the broader conservation activities in the region. In addition, by working with a large number of groups we avoided being seen as being part of the work of a particular organisation. By developing CLUZ we also produced a product that is widely known by the global conservation planning community independent of our work in Maputaland.

12. Leverage

During the lifetime of the project, additional funds were provided by EKZNW and Fórum para Natureza em Perigo to support field work during the project. We also received funding from EKZNW, the South African National Biodiversity Institute and the Society for Conservation Biology to teach workshops on systematic conservation planning in South Africa and Brazil. Our main project partners have successfully secured funds for conservation activities in Maputaland and elsewhere and so we did

not aim to strengthen their fundraising capacity. Instead, we focussed on building capacity where it was needed as part of developing the CPS.

13. Sustainability and Legacy

Project achievements

The Maputaland CPS is the most likely of our project achievements to endure because of the importance that is placed on it by our project partners. The region is the focus of a large number of ongoing development and conservation projects and all of the implementation agencies and advisory groups have welcomed the role that the CPS will play in providing information to guide these activities. This is one reason why we have recently received funding from the World Bank to continue our Maputaland project. This project will also include a capacity building element to strengthen conservation planning expertise in Mozambique further, where it is most needed. In addition, Bruno Nhancale, who undertook the MSc in Conservation Biology at DICE as part of our project, is carrying out his PhD research on further strengthening and mainstreaming the CPS. For this reason, we have transferred the project computer, two GPS units and a digital voice recorder to him to support his ongoing work.

It is also likely that we will be able to build on the success of CLUZ, as this software is now widely used by the conservation planning community. We have already started developing a new version of this software as part of a project on systematic conservation planning in the English Channel that is being funded by the European Union's Interreg programme. The developers of MARXAN have also made it clear that they will support the future development of CLUZ so that it continues to act as a user-friendly interface for their software.

The Maputaland project involved collaborating with a number of project partners and so all of the staff who worked on the project in Maputaland, other than consultants on short-term contracts, will continue in their existing roles. This means that they will generally continue to keep in touch through the on-going TFCA projects. In addition, our work in the region will ensure that the conservationists and biologists who helped develop the CPS will continue to meet and exchange ideas.

The application of the project's conclusions and outputs

It will take several years before we can be certain that our project conclusions and outputs been widely applied but there are several reasons for assuming that this will take place. First, the Umkhanyakude District Council, which is responsible for the South Africa section of Maputaland, has agreed to base their Biosphere Reserve Project plan on our assessment results. Second, the Government of Mozambique has committed to working with DICE over the next three years to develop the Maputaland CPS and develop new systems for the Greater Limpopo and Chimanimani TFCAs. Thus, it is likely that the approach that we have developed during the Maputaland project will be adopted by the Government of Mozambique throughout the country. Third, we are working closely with the Lubombo TFCA and the Peace Parks Foundation and they are keen to use the MCA to guide developments in the region. We have also received feedback through conversations and e-mail messages that CLUZ is widely used by members of the conservation planning community.

The project legacy could have been improved by further building capacity and mainstreaming the Maputaland CPS but we are confident that this will be achieved in the future, given our continuing involvement in the region.

Additional funding

We have already received to build on the Maputaland project and this has been obtained from three sources. First, the sum of has been provided by the World Bank as part of the "Transfrontier Conservation Areas and Tourism Development Project" that is being undertaken by the Government of Mozambique.

DICE has been asked to run the conservation planning component of this project, which involves building on the Maputaland CPS and developing new systems for the Greater Limpopo and Chimanimani TFCAs. The Project Officer will be employed part-time for the next three years to undertake this work, which will involve a strong capacity building element. The World Bank is also providing for a DNAC member of staff to undertake the MSc in Conservation and Tourism at DICE, and their project on ecotourism planning in Chimanimani will make up part of the broader TFCA project.

Second, we have received from the African Wildlife Foundation and from the University of Kent to allow Bruno Nhancale to undertake a PhD at DICE entitled "Strengthening and mainstreaming the Maputaland systematic conservation planning system". His PhD will build on our existing work by including extra information of plant resource harvesting, freshwater biodiversity and the economic value of ecosystem services. He will also have a lead role in undertaking the next MCA. In this way we will ensure that the Maputaland CPS continues to be used for at least the next three years. We will also ensure that a Mozambican national is trained in conservation planning at the highest level, further building local capacity.

Third, we have received funding in kind to build on the success of CLUZ by producing an ArcGIS version of our software. One week of expertise is being funded through an EU Interreg project that is developing a conservation planning system for the English Channel. This input is worth and a volunteer from Imperial College is providing a further 3 weeks of time. If necessary, we also plan to apply for further funding through a small grant scheme to complete this project

14. Value for money

The Maputaland project was good value for money for the following reasons:

- 1) The project produced the Maputaland CPS and trained a large number of people in the systematic conservation planning approach on a relatively limited budget. We were able to achieve this because the project was designed to fit in with the existing TFCA initiative and to fill a specific capacity and skills gap. This meant that we could share resources with our partners and take advantage of existing management structures, dissemination networks and expertise to produce more effective outputs.
- 2) We adopted a similar approach when developing CLUZ, as we worked together with the developers of MARXAN to produce an interface for their software, rather than developing another new conservation planning programme. MARXAN has a number of important features but was not designed for use by conservation practitioners in developing countries. Therefore, we produced software that addressed this limitation with MARXAN and so maximised its value to the conservation planning community.
- 3) We were also able to increase our training and research outputs by taking advantage of the MSc in Conservation Biology course at DICE. Five MSc students worked on our project as part of their MSc research projects and this helped provide information for the Maputaland CPS and for our project partners. In addition, we provided training in conservation planning for DICE MSc students from a number of developing countries.

15. Appendix I: Project Contribution to Articles under the Convention on Biological Diversity (CBD)

Project Contribution to Articles under the Convention on Biological Diversity		
Article No./Title	Project %	Article Description
6. General Measures for Conservation & Sustainable Use		Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	0	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation	40	Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation	0	Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity	0	Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures	0	Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training	40	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).
13. Public Education and Awareness	0	Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
14. Impact Assessment and Minimizing Adverse Impacts	0	Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
15. Access to Genetic Resources	0	Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair and equitable way of results and benefits.

16. Access to and Transfer of Technology	10	Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
17. Exchange of Information	10	Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
19. Bio-safety Protocol	0	Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
Total %	100%	Check % = total 100

16. Appendix II Outputs

Please quantify and briefly describe all project outputs using the coding and format of the Darwin Initiative Standard Output Measures.

Code	Total to date	Detail (←expand box)
Training Outputs		
1a	0	N/A
1b	0	N/A
2	2	Two students completed the MSc in Conservation Biology at DICE
3	0	N/A
4a	9	One 1 hour lecture on conservation planning given to the DICE BSc in Biodiversity Conservation and Management.
4b	0	N/A
4c	47	Six hour workshop on conservation planning taught as part of the DICE MSc in Conservation Biology in 2004, 2005 & 2006.
	39	Ninety minute workshop on designing a conservation planning system for attendees of the Student Conference on Conservation Science in 2005 and 2006.
	45	One 2 day workshop on systematic conservation planning for students attending the annual Society for Conservation Biology meeting in Brasilia, 2005.
4d	0	N/A
5	0	N/A
6a	5	Three hour training of community members from Matherijwa and Tembe Tribal Authorities in using GPS units and collecting and inputting questionnaire data in 2004.
	7	Two hour training of community members from the KwaJobe community in using GPS units and collecting questionnaire data in 2004.
	46	Four 2 day workshops and two 1 day workshop given in Swaziland, Mozambique and South Africa to train project partners to use CLUZ and MARXAN.
	80	Two hour presentation and training for participants at the 2006 South African Biodiversity Implementation Forum.
6b	0	N/A
7	1	One CLUZ software tutorial and guide explaining the software's functions.
	2	Data collection protocols for collecting information for ground-truthing the Maputaland landcover map and for mapping spatial patterns of plant harvesting.
	1	Landcover classification scheme
	1	Set of training materials on conservation planning
	1	A4 poster entitled "Preliminary conservation plan for Maputaland, South Africa"
	1	A0 Poster entitled "Producing a preliminary conservation plan for Maputaland, South Africa"
1	A0 Poster showing a satellite image of Maputaland explaining the value of the region in five local languages	

Code	Total to date	Detail (←expand box)
Research Outputs		
8	33	30 weeks spent by Project Officer and 3 weeks spent by Principal Investigator.
9	1 7	Maputaland Conservation Assessment report DICE MSc in Conservation Biology research dissertations on the following topics: assessing the feasibility of community-based conservation projects in Maputaland; measuring and modelling the spatial patterns of plant resource in Maputaland, large mammal conservation and its role in the development of Maputaland's protected area network
10	0	N/A
11a	2	One article published in the journal <i>Oryx</i> , one article published in the journal <i>BioScience</i> .
11b	0	N/A
12a	6	Landcover GIS map Ecological zone GIS map Risk of agricultural transformation GIS map Risk of over-harvesting GIS map Game ranching profitability GIS map Priority conservation area GIS map Maputaland Conservation Planning System
12b	0	N/A
13a	0	N/A
13b	0	N/A

Dissemination Outputs		
14a	1	Workshop in Maputo to disseminate earlier project results
14b	1	Oral presentation at SCB conference in New York, 2004
	1	Oral presentation at SCB conference in Brasilia, 2005
	1	Poster presentation at SCB conference in San Jose, 2006
	1	Oral presentation at CEFAS, 2005
	1	Oral presentation at the European Crop Wild Relative Diversity Assessment and Conservation Forum, 2005
15a	1	Press release describing preliminary conservation map for South African section of Maputaland produced in English and isiZulu.
15b	0	N/A
15c	0	
15d	1	Press release describing preliminary conservation map for South African section of Maputaland published on University of Kent and Darwin Initiative website and printed in Kent Messenger newspaper.
	1	Press release on Swaziland conservation plan published on Darwin Initiative website.
16a	3	Annual Newsletters
16b	120	Newsletters were e-mailed to 70 people and put on website
16c	60	Newsletters were e-mailed to 10 people and put on website
17a	3	Maputaland website
		CLUZ website
		Step by step guide to conservation planning website
17b	0	
18a	0	
18b	0	
18c	0	
18d	0	
19a	0	
19b	0	
19c	0	
19d	1	One radio interview about project in local station KM FM
Physical Outputs		
20		
21	0	
22	0	
23		

17. Appendix III: Publications

Type	Detail	Publishers	Available from	Cost £
Journal article*	<i>Systematic conservation planning: a review of perceived limitations and an illustration of the benefits using a case study from Maputaland, South Africa.</i> Smith, RJ, Goodman, PS and Matthews, WS (2006).	<i>Oryx</i> 40, 400-410.	http://www.mosaic-conservation.org/maputaland/outputs.html	Free
Journal article*	<i>Improving the Key Biodiversity Areas approach for effective conservation planning.</i> Knight, AT, Smith, RJ, Cowling, RM, Desmet, PG, Faith, DP, Ferrier, S, Gelderblom, CM, Grantham, H, Lombard, AT, Maze, K, Nel, JL, Parrish, JD, Pence, GQK, Possingham, HP, Reyers, B, Rouget, M, Roux, D, and Wilson, KA (2007).	<i>BioScience</i> , 57, 256-261.	http://www.mosaic-conservation.org/maputaland/outputs.html	Free
Website	Maputaland project website	N/A	http://www.mosaic-conservation.org/maputaland	Free
Website	CLUZ website	N/A	http://www.mosaic-conservation.org/cluz	Free
Website	Step-by-step guide to systematic conservation planning	N/A	http://www.mosaic-conservation.org/cluz/steps.html	Free
Manual	CLUZ tutorial, guide and explanation. R.J. Smith (2005)	N/A	http://www.mosaic-conservation.org/cluz	Free
Teaching materials*	PowerPoint presentation: "Designing conservation landscapes: an introduction to systematic conservation planning." R.J. Smith (2005)	N/A	http://www.mosaic-conservation.org/maputaland/outputs.html	Free
Teaching materials*	Workshop exercise: Designing a systematic conservation planning system: an example from Swaziland. R.J. Smith (2005)	N/A	http://www.mosaic-conservation.org/maputaland/outputs.html	Free

Report*	The Maputaland Conservation Planning System and Conservation Assessment. Smith & Leader-Williams (2006)	N/A	http://www.mosaic-conservation.org/maputaland/outputs.html	Free
Report	A landcover classification system for Maputaland. Smith (2006)	N/A	http://www.mosaic-conservation.org/maputaland/outputs.html	Free
Poster	Initial guide for conservation planning in Maputaland, South Africa.	N/A	http://www.kent.ac.uk/anthropology/dice/resources/planning_poster.pdf	Free
Poster	Producing a preliminary conservation plan for Maputaland, South Africa	N/A	Available from Project Officer (r.j.smith@kent.ac.uk)	Free
Poster	Maputaland satellite image poster	N/A	Available from Project Officer (r.j.smith@kent.ac.uk)	Free
DICE MSc thesis	<i>Modelling tree resource harvesting on communal land in the Maputaland Centre of Endemism.</i> PA Brookes (2004).	N/A	Project CD	Free
DICE MSc thesis	<i>Local community perceptions of the establishment of a community conservation area in Usuthu Gorge, South Africa.</i> N Chao (2004).	N/A	Project CD	Free
DICE MSc thesis	<i>Hunting for conservation targets: designing a community-conservation area network for Maputaland, South Africa.</i> J Easton (2004)	N/A	Project CD	Free
DICE MSc thesis*	<i>Modelling spatial distribution of tree resource harvesting in Maputaland, South Africa.</i> L McRae (2005)	N/A	Project CD	Free
DICE MSc thesis*	<i>Developing resource-use buffer zones along the Northern boundary of Mkhuze Game Reserve: a feasibility study.</i> P Ngwenya (2005)	N/A	Project CD	Free
DICE MSc thesis*	<i>Modelling future human-elephant conflict in Maputaland, Mozambique.</i> BA Nhancale (2005)	N/A	Project CD	Free

DICE MSc thesis*	<i>An investigation into poaching in Mkhuze Game Reserve, South Africa.</i> C.M. Ransom (2005)	N/A	Project CD	Free
Newsletter	Maputaland Transnational Conservation Planning Project Newsletter No 1	N/A	http://www.kent.ac.uk/anthropology/dice/resources/Map_news1_en.pdf	Free
Newsletter	Maputaland Transnational Conservation Planning Project Newsletter No 2	N/A	http://www.kent.ac.uk/anthropology/dice/resources/Map_news2_en.pdf	Free
Newsletter*	Maputaland Transnational Conservation Planning Project Newsletter No 3	N/A	http://www.kent.ac.uk/anthropology/dice/resources/Map_news3_en.pdf	Free
Protocol	<i>Protocol for collecting data to groundtruth the Maputaland landcover map.</i> RJ Smith (2005)	N/A	http://www.mosaic-conservation.org/maputaland/outputs.html	Free
Protocol	<i>Protocol for collecting data on bark-stripping and tree-cutting in the Maputaland centre of endemism.</i> PA Brookes & RJ Smith (2005)	N/A	http://www.mosaic-conservation.org/maputaland/outputs.html	Free
Software	CLUZ	N/A	http://www.mosaic-conservation.org/cluz	Free
Software	MARXAN boundary maker	N/A	http://www.mosaic-conservation.org/gis	Free
GIS data	Maputaland Conservation Planning System*	N/A	Project CD	Free
GIS data	10 ASTER satellite images & 5 Landsat ETM satellite images*	N/A	Project CD	Free
GIS data	Priority area map*	N/A	Project CD	Free
GIS data	Landcover map*	N/A	Project CD	Free
GIS data	Ecological zone coverage*	N/A	Project CD	Free
GIS data	Ranch profit GIS coverage*	N/A	Project CD	Free
GIS data	Transformation risk coverage*	N/A	Model on Project CD	Free
GIS data	Risk of over-harvesting coverage*	N/A	Model on Project CD	Free

All materials that are included with this report are marked with (*)

18. Appendix IV: Darwin Contacts

To assist us with future evaluation work and feedback on your report, please provide contact details below.

Project Title	Transnational conservation planning in the Maputaland ecoregion of southern Africa.
Ref. No.	162/12/006
UK Leader Details	
Name	Professor Nigel Leader-Williams
Role within Darwin Project	Principle Investigator
Address	Durrell Institute of Conservation and Ecology
Phone	
Fax	
Email	
Other UK Contact (if relevant)	
Name	Dr Bob Smith
Role within Darwin Project	Project Officer
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Phone	
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Email	
Partner 1	
Name	Dr Pete Goodman
Organisation	Ezemvelo KwaZulu-Natal Wildlife
Role within Darwin Project	Project Partner – South Africa
Address	Ezemvelo KwaZulu-Natal Wildlife
Fax	
Email	
Partner 2 (if relevant)	
Name	Dr Bartolomeu Soto
Organisation	National Directorate of Conservation Areas (DNAC)
Role within Darwin Project	Project Partner – Mozambique
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Fax	
Email	