

<b>Institution: University of Kent</b>
<b>Unit of Assessment: Anthropology and Development Studies UoA 24</b>
<b>Title of case study: Protected Area Design</b>
<p><b>1. Summary of the impact</b></p> <p>Work by Dr Robert Smith continues to be used by government agencies in Mozambique and South Africa, has already guided the development of Protected Areas (PAs) with a combined area of 25,000 hectares, and has been used by the Critical Ecosystem Partnership Fund to identify spatial priorities for their US\$6.5 million funding programme. The team's research has had an obvious, direct and significant environmental impact in those regions. It has also had a broader global impact, including shaping the International Union for the Conservation of Nature's (IUCN) revised Key Biodiversity Area approach and developing software and training materials for conservation practitioners working in 103 countries. Protected Areas are the most widely used international approach for conserving biodiversity. Our research in Southern Africa is leading the development of systems for designing PA networks that meet biodiversity targets and minimise negative impacts on people in surrounding communities.</p>
<p><b>2. Underpinning research</b></p> <p>Conservation academics have played a major role in developing rigorous, transparent and scientifically defensible approaches for identifying priority areas for conservation. However, there is still a mismatch between these approaches and those adopted by some conservation practitioners, which limits the effectiveness of work on the ground. The underpinning research for this impact case study, led by Dr Robert Smith at University of Kent (employed 2003 to present) sought to address these problems. The research was supported by funding from the World Bank, Darwin Initiative and Russell E. Train Education for Nature Program/the African Wildlife Foundation/Ministry of Science, Mozambique, totalling just over £207,000 (full details in section 3, points a, b, c). Smith worked in partnership with non-academic user communities in South Africa, Swaziland and Mozambique to identify priorities for conservation in those countries, and collaborated with academics and practitioners from international conservation NGOs to develop a new approach for identifying conservation priorities at a global scale. The contribution of the University of Kent was therefore significant. The underpinning research was published together with academics and staff from government conservation agencies and focused on the following areas:</p> <p>(i) <b>Addressing misconceptions about the systematic conservation planning approach:</b> Smith was the lead researcher for an article in <i>Oryx—The International Journal of Conservation</i> which identified five factors in systematic conservation planning that were perceived by practitioners to be limitations. These perceived limitations include, for example, difficulties in using planning software; the costs of systematic conservation planning; and its extensive data requirements. Smith et al. demonstrated how these perceptions are generally misplaced, and illustrated the value of systematic conservation planning to practitioners using a case study that describes a low-cost exercise from Maputaland, South Africa.</p> <p>(ii) <b>Including implementation-relevant data in systematic conservation planning:</b> Innovative research on transnational conservation planning work in Southern Africa, led by Smith and published in the journal <i>Biological Conservation</i>, was the first to incorporate biodiversity, socio-economic and implementation data to provide policy-relevant guidance. The research involved producing distribution data on important species and habitat types, modelling the risk of agricultural transformation as a surrogate for farming opportunity cost, and modelling potential revenue from wildlife ranching, an important local industry. The data were then combined to identify priority conservation areas that met biodiversity targets whilst minimising negative impacts on local livelihoods.</p> <p>(iii) <b>Critiquing the Key Biodiversity Area (KBA) approach:</b> The KBA approach was developed by several international conservation NGOs and advocated as the best system for identifying globally important conservation areas. Together with colleagues from South Africa, the USA and Australia, Smith published an article in the journal <i>BioScience</i> showing the KBA system was flawed</p>

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because it: (a) failed to account for social, political and socio-economic factors that are important for implementation, and (b) selected priority sites on a case-by-case basis, rather than using much more efficient techniques that identify networks of complementary priority areas. Instead, the article argued the KBA approach should be modified to focus on irreplaceable areas for only the most threatened species, and that the systematic conservation planning approach should underpin all priority setting systems.

### 3. References to the research

- i. **Smith, R.J.**, P.S. Goodman and W.S. Matthews (2006). Systematic conservation planning: a review of perceived limitations and an illustration of the benefits using a case study from Maputaland, South Africa. *Oryx* 40: 400-410. doi: 10.1017/S0030605306001232.
- ii. Knight, A.T., **R.J. Smith**, R.M. Cowling, P.G. Desmet, D.P. Faith, S. Ferrier, C.M. Gelderblom, H. Grantham, A.T. Lombard, K. Maze, J.L. Nel, J.D. Parrish, G.Q.K. Pence, H.P. Possingham, B. Reyers, M. Rouget, D. Roux and K.A. Wilson (2007). Improving the Key Biodiversity Areas approach for effective conservation planning. *BioScience* 57: 256-261. doi: 10.1641/B570309.
- iii. **Smith, R.J.**, J. Easton, B.A. Nhancale, A.J. Armstrong, J. Culverwell, S. Dlamini, P.S. Goodman, L. Loffler, W.S. Matthews, A. Monadjem, C.M. Mulqueeny, P. Ngwenya, C.P. Ntumi, B. Soto and N. Leader-Williams (2008). Designing a transfrontier conservation landscape for the Maputaland centre of endemism using biodiversity, economic and threat data. *Biological Conservation* 141: 2127-2138. doi: 10.1016/j.biocon.2008.06.010.

#### Funding:

- a. £131,185 from the Darwin Initiative for a 3-year project from 2003-2006, entitled 'Transnational conservation planning in the Maputaland ecoregion of southern Africa'.
- b. US\$138,790 from The World Bank for a 3-year project from 2007-2009 entitled 'Transfrontier Conservation Areas and Tourism Development, Mozambique'.
- c. £30,000 from the Russell E. Train Education for Nature Program, the African Wildlife Foundation and the Ministry of Science, Mozambique to fund PhD research on conservation planning in Maputaland (2008-2011).

### 4. Details of the impact

In 2010, all 168 countries that are signatories to the Convention to Biological Diversity pledged to increase the area of land under protection from the current 12.2% to 17% by 2020, a combined additional area the size of Australia. Identifying priority areas for conservation is one of the most important global issues. However, much conservation planning research has had limited impact because it fails to account for factors relating to implementation. Research led by Smith at the University of Kent has been at the forefront of addressing these limitations. Its impact has international reach and is of global significance.

#### (i) **Developing socially engaged approaches to conservation, Maputaland (section 5, points A, B, D)**

Our work is helping to conserve one of the most biologically important regions in the world by identifying critical areas of habitat whilst also minimising impacts on local people. The Maputaland Centre of Endemism is internationally recognised for its conservation value. It forms part of the Maputaland-Pondoland-Albany biodiversity hotspot and contains the iSimangaliso Wetland Park World Heritage Site. However, this area is also affected by the spread of agriculture and over-harvesting of natural resources. The Governments of the three countries it falls within, South Africa, Mozambique and Swaziland, are committed to developing a transnational conservation area to conserve this important region, with the additional aim of creating jobs through ecotourism and game-ranching. We have worked with these three countries since 2003 to produce the Maputaland conservation planning system. For example:

- Our research published in *Oryx* was used in by Ezemvelo KwaZulu-Natal Wildlife, the provincial conservation agency, as evidence to block inappropriate development. J.M. Harris, Office of the Senior Manager Scientific Service, Ezemvelo KwaZulu-Natal Wildlife stated: 'we

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*relied on University of Kent research ... we have used the published priority area maps to help prevent inappropriate development in Maputaland, specifically Eucalyptus tree plantations in important wetlands, grasslands and corridor linkages. The priority area maps have recently been used to motivate against the development of a new leisure development on the shores of Lake Sibaya, an internationally important area that forms part of the Isimangaliso Wetland Park World Heritage Site'* (see letter detailed in section 5, point A).

- Our research published in *Biological Conservation* was the first to identify priority areas in the whole of Maputaland, and was used to decide where the corridor between Maputo Special Reserve in Mozambique and Tembe Elephant Park in South Africa should be declared; our research ensured this was done in a way that protected important wildlife habitat but avoided important farmlands in the development of the corridor. This led to the creation of a transfrontier PA in 2011 which has an area of 24,770 hectares and connects a previously fragmented elephant population. Connecting elephant populations allows them to move through the landscape, widening the area available to find food and water; it also increases opportunities to mate with more geographically distant populations, thus widening genetic diversity. Connecting the elephant populations also allows for greater conservation of the important wetland and sand forest habitats that the elephants travel through (see section 5, point B). Afonso Madope, Ministry of Tourism in Mozambique, states that the research '*played a key role in guiding the development of the Futi Corridor conservation area concept'* (letter detailed in section 5, point B; see also section 5, point A).
- Our research published in *Biological Conservation* has also been used since 2008 by Ezemvelo KwaZulu-Natal Wildlife as part of their Environmental Impact Assessment process to identify when proposed developments would have serious negative impacts on biodiversity. J.M. Harris, Office of the Senior Manager Scientific Service, Ezemvelo KwaZulu-Natal Wildlife stated: '*published priority area maps were incorporated into the National Protected Areas Expansion Strategy and helped guide Transfrontier Conservation Area planning ... we have used the published priority area maps to help prevent inappropriate development in Maputaland'* (see letter detailed in section 5, point A).

**(ii) Informing and defining the prioritisation process for the Critical Ecosystem Partnership Fund (CEPF) (section 5, point C)**

The CEPF is a joint program of the French and Japanese Governments, Conservation International, the Global Environment Facility, the MacArthur Foundation, and the World Bank. It funds conservation partners in biodiversity hotspots and will spend US\$6.5 million in the Maputaland-Pondoland-Albany hotspot between 2010 and 2015. These projects focus on improving conservation management and implementing new conservation approaches on private and communal protected areas. Dan Rothberg, CEPF, states: '*the University's work helped us to identify and define three of the priority sites ... the team placed a high value on the University of Kent's contribution'*.

The CEPF produced an Ecosystem Profile in 2009 to identify priority areas within the hotspot, with Kent as the only international partner involved in this process. Our work was the basis for the prioritisation process in Maputaland and so 3 of the 22 priority areas in the hotspot were identified from the analysis published in *Biological Conservation*. The impact of this was that US\$6.5 million from the CEPF was spent in those 22 priority areas rather than elsewhere. This is detailed in CEPF (2010) *Ecosystem Profile: Maputaland-Pondoland-Albany hotspot* (Conservation International Southern African Hotspots Programme and South African National Biodiversity Institute, Cape Town, South Africa) available at:

[http://www.cepf.net/Documents/DC\\_Finaldraft\\_MPAHprofile\\_Feb262010.pdf](http://www.cepf.net/Documents/DC_Finaldraft_MPAHprofile_Feb262010.pdf)

**(iii) Changing global conservation planning practice (section 5, points A, B, E)**

Our research in Maputaland has underpinned conservation planning research projects in a number of other countries. Since 2007 we have been working with the Government of Mozambique and Eduardo Mondlane University on a project to develop new techniques to modify the Zinave and Banhine National Parks, and develop a management zoning plan for the Chimanimani National Park. Afonso Madope, Ministry of Tourism in Mozambique, states that the research '*guided the zoning ... and boundary changing'* of these three PAs (letter detailed in section 5, point B).

In 2010, Smith's team received funding from the Global Environment Facility for research to apply this approach to West Africa on a project that seeks to mitigate the impacts of climate change on PAs in the region. In 2013 we used the software and systems we developed in Maputaland to work with the Government of Guyana to identify priority areas for conservation in their country, and to work with the Governments of Malaysia and Indonesia to investigate the impacts of climate change and land transformation on priority areas for mammal conservation in Borneo.

Our research on making systematic conservation planning more relevant for practitioners has also led to the development of the CLUZ (Conservation Land-use Zoning) project. CLUZ is a GIS interface that allows users to design protected area networks and conservation landscapes. It was developed by Smith and funded by the British Government through their Darwin Initiative for the Survival of Species. This software and training manual has been downloaded by 1181 people from 103 countries since it was launched in 2004. CLUZ now has 27 citations in Google Scholar by academics, government and practitioners. These citations include reports describing implementation projects in Brazil, Canada, Reunion, South Africa, USA and Vietnam (section 5, point E).

**(iv) Changing global conservation planning policy**

Our critique in *BioScience* of the Key Biodiversity Areas approach was widely read and began a dialogue with BirdLife International, Conservation International and the International Union for Conservation of Nature (IUCN). IUCN is an organisation made up of more than 12,000 member organisations, including 200 governments and 900 NGOs, and it has committed since 2012 to produce a revised version of the KBA approach that will become a standard part of the Red List species conservation assessment. The team led by Smith is involved in an on-going research project to improve the scientific defensibility of the KBA approach, which is being led by IUCN's World Commission on Protected Areas – Species Survival Commission Joint Task Force on Biodiversity and Protected Areas.

Our research in *BioScience* has therefore played a large role in shaping the KBA approach and developing a system that will help conserve threatened species throughout the world. These future impacts of the research are evidence of the sustained reach and significance of the research in the longer term. In a letter from IUCN, research by the University of Kent is credited with '*influencing and changing planning practices in real world conservation ... Dr Smiths work serves as a model for how such constructive interaction can change the relationship between theory and practice*' (section 5, point D).

**5. Sources to corroborate the impact**

- A. Letter of support from Dr J.M. Harris, Office of the Senior Manager Scientific Service, Ezemvelo KwaZulu-Natal Wildlife detailing how the priority area maps were used to guide conservation planning and to prevent inappropriate development initiatives.
- B. Letter of support from Afonso Madope, Ministry of Tourism in Mozambique stating that the research led by Dr Robert Smith at University of Kent was used as a guide in developing the Futi Corridor.
- C. Letter of support from Dan Rothberg, CEPF detailing the value of the research lead by Dr Robert Smith; also see CEPF (2010). Ecosystem Profile: Maputaland-Pondoland-Albany hotspot. Conservation International Southern African Hotspots Programme and South African National Biodiversity Institute, Cape Town, South Africa  
[http://www.cepf.net/Documents/DC\\_Finaldraft\\_MPAHprofile\\_Feb262010.pdf](http://www.cepf.net/Documents/DC_Finaldraft_MPAHprofile_Feb262010.pdf)
- D. Letter from IUCN, detailing how research by the University of Kent is engaged in influencing and changing conservation practice.
- E. CLUZ website, <http://anotherbobsmith.wordpress.com/software/cluz/>