Land Use Policy xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

Criteria for selection and evaluation of biosphere reserves in support of the UNESCO MAB programme in South Africa

Ruida Pool-Stanvliet[a,*], Susanne Stoll-Kleemann[b], Jan H. Giliomee[c]

[a] Western Cape Nature Conservation Board, Private Bag X5014, Stellenbosch, 7599, South Africa
[b] Ernst-Moritz-Arndt-Universität, Institute for Geography and Geology, Friedrich-Ludwig-Jahn-Str. 16, D-17487, Greifswald, Germany
[c] University of Stellenbosch, Department of Botany & Zoology, Stellenbosch, 7600, South Africa

ARTICLE INFO

Keywords:
MAB programme
Biosphere reserves
Effectiveness
Landscape management
Social-ecological systems
Criteria

ABSTRACT

The biosphere reserve model is a global designation in accordance with UNESCO's Man and the Biosphere Programme. Biosphere reserves are required to fulfil three functions as prescribed by UNESCO, namely conservation, sustainable development and logistic support. Worldwide, the 669 biosphere reserves in 120 countries are experiencing different degrees of effectiveness in fulfilling these functions.

This paper investigates trends in the selection of sites for new biosphere reserves and puts forward a set of criteria for the establishment of future biosphere reserves in South Africa, in order to capitalize on the potential of the MAB Programme. Given the country's limited natural, economic and social resources, there is a need to prioritize where these resources could best be allocated. Presently, new sites for biosphere reserves in South Africa are randomly nominated, resulting in biosphere reserves that are not always optimally located. The proposed suite of biosphere reserve criteria for South Africa has the potential to be of valuable assistance in selection processes for future effective and efficient biosphere reserves that will proudly earn their rightful place in the South African landscape. The criteria are structured according to four subsections, namely a general section that addresses national matters of general concern to the MAB Programme, and three sections covering the three biosphere reserve functions.

These criteria also have the potential to be adapted to the needs of other developing countries in support of the effective implementation of the MAB Programme.

1. Introduction

The UNESCO Man and the Biosphere (MAB) Programme finds spatial expression in sites designated as biosphere reserves. These sites are nominated by national governments and, subsequent to a review process, are designated by UNESCO. Biosphere reserves must meet a minimal set of criteria and conditions to be designated, subsequently forming part of the World Network of Biosphere Reserves (WNBR), currently comprising 669 biosphere reserves in 120 countries. The WNBR is one of only four global networks that include designated protected areas (Price et al., 2010). Consequently, biosphere reserves provide an expansive network of similarly defined sites around the world. Biosphere reserves are widely recognized as an excellent landscape management option through which to showcase sustainable development in action (Bridgewater, 2002, 2016; Edge and McAllister, 2008; Pool-Stanvliet and Giliomee, 2013), and are ideally positioned to assist countries in meeting the sustainable development goals (SDGs), adopted by the United Nations in September 2015. The fourth World Congress of Biosphere Reserves, held in Lima, Peru in March 2016, endorsed the Lima Action Plan (LAP), which was subsequently adopted by the MAB International Coordinating Council. The first action of the LAP specifically states that biosphere reserves are models contributing to the implementation of the SDGs (UNESCO, 2017).

A biosphere reserve encompasses three elements: core area(s) that are statutory protected, buffer zone(s) adjoining or surrounding the core areas, and a transition area. Given the required status of the core areas, biosphere reserves typically incorporate sites (as part of the core areas) that are listed in accordance with IUCN's Protected Area Management Categories, and which are therefore protected under national legislation. However, the entire conservation estate included in buffer and transition zones, does not necessarily have formal IUCN listing. Furthermore, biosphere reserves are not spatially exclusive and often include land parcels designated in accordance with other international designations such as World Heritage sites and Ramsar sites (Price et al., 2010; Schaaf and Clamote Rodrigues, 2016).

The government of South Africa strives to find the much needed

* Corresponding author.
E-mail addresses: rstanvliet@capenature.co.za (R. Pool-Stanvliet), stollkle@uni-greifswald.de (S. Stoll-Kleemann), jhg@sun.ac.za (J.H. Giliomee).

https://doi.org/10.1016/j.landusepol.2018.02.047
Received 29 September 2017; Received in revised form 23 February 2018; Accepted 23 February 2018

Box 1
Criteria as listed in Article 4 of the Statutory Framework of the World Network of Biosphere Reserves

General criteria for an area to be qualified for designation as a biosphere reserve:

1. It should encompass a mosaic of ecological systems representative of major biogeographic regions, including a gradation of human interventions.
2. It should be of significance for biological diversity conservation.
3. It should provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale.
4. It should have an appropriate size to serve the three functions of biosphere reserves.
5. It should include these functions, through appropriate zonation, recognizing:
   (a) a legally constituted core area or areas devoted to long-term protection, according to the conservation objectives of the biosphere reserve, and of sufficient size to meet these objectives;
   (b) a buffer zone or zones clearly identified and surrounding or contiguous to the core area or areas, where only activities compatible with the conservation objectives can take place;
   (c) an outer transition area where sustainable resource management practices are promoted and developed.
6. Organizational arrangements should be provided for the involvement and participation of a suitable range of inter alia public authorities, local communities and private interests in the design and carrying out the functions of a biosphere reserve.
7. In addition, provisions should be made for:
   (a) mechanisms to manage human use and activities in the buffer zone or zones;
   (b) a management policy or plan for the area as a biosphere reserve;
   (c) a designated authority or mechanism to implement this policy or plan;
   (d) programmes for research, monitoring, education and training.

balance between economic growth, social development and environmental sustainability, while dealing with a number of critical challenges, including poverty, unemployment and inequality (DEA, 2017; DSD, 2017). In addition to these social issues, the critical challenge of climate change impacts on environmental, social and economic systems. The new MAB Strategy and accompanying LAP encourage countries to use biosphere reserves towards fostering sustainable development and to 'contribute to sustainable, healthy, and equitable societies, economies and thriving human settlements' (UNESCO, 2017). These inherent attributes of the MAB Programme put biosphere reserves in a position to assist national government in finding landscape-based solutions to South Africa's pressing challenges.

The official UNESCO criteria for designation as a biosphere reserve are set out in Article 4 of the Statutory Framework of the World Network of Biosphere Reserves (Box 1 – UNESCO, 1996). The first two criteria address biodiversity significance and specify that a new biosphere reserve needs to be representative of a biogeographic region. The trait of representativeness is crucial where it refers to representation of important biological diversity at a specific scale and could refer to various units, such as biogeographical provinces (Udvardy, 1975), ecoregions (Olson and Dinerstein, 2002), biomes (Margules and Pressey, 2000), bioregions (Brunckhorst, 2000; Rutherford et al., 2006), vegetation types, ecosystems or habitat types (Margules and Pressey, 2000). The aim would be to cover the full range of the selected unit in a national network of biosphere reserves.

The question therefore arises: which process is most applicable to the selection of sites for new biosphere reserves that could form a well-designed network of social-ecological systems in a specific country. In the past, spatial selection of protected areas was based mostly on opportunism (Pressey and Taffs, 2001). In some cases, selection of sites was done in an ad hoc way, based on the availability of land, most of which have been land that are not commercially valuable or relatively rugged (Pressey et al., 1993; Pressey, 1994; Cowling et al., 1999; Margules and Pressey, 2000; Pressey and Taffs, 2001; Rodriques et al., 2004; Knight and Cowling, 2007). Other reasons for selecting protected areas included spectacular scenery (Terborgh and Winter, 1983), tourist revenue (Huntley, 1978) and water catchments (Rebelo and Siegfried, 1992). These methods result in protected areas not always being selected in a systematic manner. This is a practice which should be prevented in the selection of future biosphere reserves, given that biosphere reserves include protected areas as part of their core areas.

A recent multicase study on biosphere reserves in South Africa indicated that not all biosphere reserves are equally effective in their implementation of the three functions of (i) conservation (contributing to the conservation of landscapes, ecosystems, species and genetic variation); (ii) sustainable development (fostering economic and human development which is socio-culturally and ecologically sustainable); and (iii) logistic support (supporting demonstration projects, environmental education, training, research and monitoring), and that all biosphere reserves in the country face an uncertain future due to pressing challenges (Pool-Stanvliet, 2014). Despite these findings, and due to the socially-inclusive nature of biosphere reserves, the concept is particularly favoured in developing countries (Coetzer et al., 2013). The South African government supports the MAB concept as a framework to re-coordinate different programmes and projects within a certain area with a focus on sustainable development. This recognition is demonstrated through the growing number of biosphere reserves, endorsed by national government for UNESCO designation (Table 1).

At present, all of the nine South African biosphere reserves, as well as the one currently on review, are being managed through non-profit companies (Table 1). This is similar to Canadian biosphere reserves where activities are also coordinated by community-based structures, and biosphere reserves do not have legal jurisdiction over land, waters and resources (Reed, 2016). The non-profit management entities comprise representatives of a wide range of stakeholders, including communities, conservation agencies and government departments. Nonetheless, most of their accomplishments are being sustained by volunteer involvement. This is contrary to the findings of Schultz et al. (2011) where it was indicated that volunteer contributions should only complement formal, funded management of biosphere reserves. However, due to the virtual absence of government funding for biosphere reserves in South Africa, the fundraising abilities of volunteers contribute greatly towards ensuring financial sustainability of the respective biosphere reserves.

Biosphere reserves need to be optimally located in order to secure long-term persistence, efficiency and effectiveness. These sites need to be representative of biodiversity, efficiently managed, and persistent in the long run. Presently in South Africa, national government submits nominations of new biosphere reserves to UNESCO in an ad hoc manner, generally in response to requests by interested community groups, though with support from the relevant provincial government (Pool-Stanvliet, 2014). Although these nominations are supported by