Journal of Southern African Studies

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cjss20

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To cite this article: David Bunn, Bram Büscher, Melissa R. McHale, Mary L. Cadenasso, Daniel L. Childers, Steward T.A. Pickett, Louie Rivers III & Louise Swemmer (2022) Golden Wildebeest Days: Fragmentation and Value in South Africa's Wildlife Economy After Apartheid, Journal of Southern African Studies, 48:6, 1013-1035, DOI: 10.1080/03057070.2022.2145776

To link to this article: https://doi.org/10.1080/03057070.2022.2145776

Published online: 12 Jan 2023.

Journal of Southern African Studies, 2022
Vol. 48, No. 6, 1013–1035, https://doi.org/10.1080/03057070.2022.2145776

Golden Wildebeest Days: Fragmentation and Value in South Africa's Wildlife Economy After Apartheid

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There are renewed global efforts to make wildlife conservation the foundation for broad-based economic development. This article looks at these tendencies in the 'Kruger to Canyons' (K2C) biosphere region in South Africa, encompassing the Kruger National Park and adjacent settlement areas and reserves. Various forms of the wildlife economy have a long history in this region. However, it is increasingly posited as a preternatural means for creating jobs. We chronicle the growth of the wildlife economy from its apartheid heyday to

the present, showing its fundamental dependence on the ecological and political fragmentation of space. More generally, these biopolitical divisions are part of a broad contestation of wildlife value, organised around changing regimes of protected area enclosure and the spacing of human and non-human life. Despite recent claims by the South African conservation industry that it is demolishing fences and increasing habitat connectivity, political territorialisation and ecological fragmentation continue to be important means of securing profit and reducing perceived risk. While the contradictions of this dynamic have now become acute through the emergence of the rhino-poaching crisis, the growth of that violent industry, we conclude, should not be seen as the negative inversion of a legal wildlife economy. Instead, both the legal and the illegal wildlife economies are manifestations of the same underlying problems: ill-conceived attempts at agrarian reform; the persistent influence of an older veterinary wildlife assemblage; the continued role of the rural poor as an enabling but unacknowledged buffer between development and wildlife.

Keywords: wildlife economy; apartheid; buffer zones; fragmentation; Kruger National Park; protected areas; agrarian restructuring

Introduction

For South African game animal breeders, 2013 was an extraordinarily profitable year: a disease-free Cape Buffalo bull [*Syncerus caffer caffer*] was sold at auction for US$4 million, and the total turnover for public sales of game animals approached US$100 million.[1] Sensational profits such as these have attracted the attention of wealthy private investors and increased interest from government institutions. For the latter, rich returns on private game-breeding investments also signal a potential new deal for the rural poor: inclusion in a 'wildlife economy'. The term 'wildlife economy' is generally applied to market segments such as safari tourism and wildlife photography, wilderness experience, hunting, venison production, game ranching, live game sales and the development of eco-estates.[2] Investment in this sector, it is now broadly claimed, will result in rural economic growth and enhanced prosperity for those impoverished communities that have historically been excluded from the benefits of conservation. In addition, proponents argue, broadening the beneficial reach of this economy will increase ecological resilience and produce a more stable state in local governance. Our purpose in this article is to sound caution around such arguments.

Focusing on protected areas, communal lands and wildlife ranching in the north-east of South Africa, we offer an overview of recent trends in the development of the wildlife economy. We explore the contradictions inherent in attempts by a variety of landowners to manage the value of their wildlife tourism product through spatial solutions that have a wider regional impact on biodiversity. Ultimately, this leads us to an examination of the South African wildlife ranching industry, which was booming until recently, and government attempts to capitalise on this growth by redirecting it into job creation programmes. Our study is presented in five stages: i) a contextualising historical overview of ecological fragmentation in the 'Kruger to Canyons' (K2C) region, including the Kruger National Park (KNP); (ii) an examination of the impact of veterinarian fencing regimes; (iii) a more detailed discussion of the relationship between fragmentation and value in game ranching; (iv) the private reserves; (v) the dark economies of illicit wildlife trafficking.

1 C. Spillane and K. Crowley, 'Buffalo Horns Worth Millions Lure South African Billionaires' (7 January 2015), available at https://www.bloomberg.com/news/articles/2015-01-07/buffalo-bull-market-lures-billionaires-with-horns-worth-millions, retrieved 16 February 2017.

2 B. Child, J. Musengezi, G.D. Parent and G.F.T. Child, 'The Economics and Institutional Economics of Wildlife on Private Land in Africa', *Pastoralism: Research, Policy and Practice*, 2, 18 (2012), pp. 1–32.

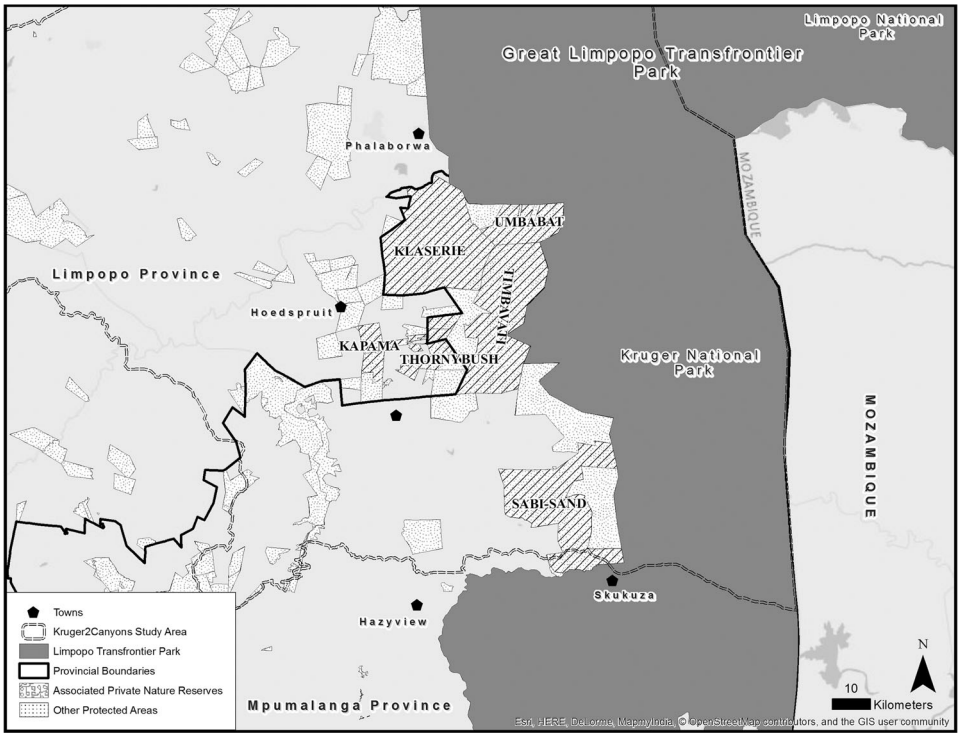

Figure 1. The Kruger to Canyons biosphere region (K2C). (Adapted from K.L. Coetzer, B.F. Erasmus, E.T.F. Witkowski and A.K. Bachoo, 'Land-Cover Change in the Kruger to Canyons Biosphere Reserve [1993–2006]: A First Step Towards Creating a Conservation Plan for the Subregion', *South African Journal of Science*, 106, 7–8 [2010], pp. 1–10.)

Spatial Contexts for an Expanded Wildlife Economy

In 2014, South Africa's Department of Environmental Affairs (DEA) embarked on an ambitious scheme to develop the wildlife economy in the savanna areas demarcated by the Bushbuckridge local municipality and the UNESCO-defined K2C biosphere region. At the heart of this project was a concerted effort to include the rural poor in a mixed-use, wildlife-focused buffer zone roughly 20 kilometres wide alongside the KNP (see Figure 1), a strategy which, it was claimed, would produce 60,000 new jobs by 2030.[3] Much of this wildlife economy, in turn, focused on the KNP and its surrounding areas.

At almost 20,000 square kilometres in extent, Kruger is one of the largest terrestrial conservation areas on the planet. While its remarkable biodiversity attracts almost 1.8 million visitors a year, the park also epitomises many contradictions associated with nature-based tourism in South Africa at large. It is bordered over its fenced 350-kilometre western boundary by two provinces, seven district municipalities, and a population of roughly 2 million people.[4] Approximately half of these people live within 20 kilometres of the western boundary fence of Kruger in several hundred villages that are in turn governed by 38 different tribal authorities. Most are unemployed and dependent on social grants for their

3 Department of Environmental Affairs, Republic of South Africa, 'Biodiversity Economy Strategy', Notice 965 of 2015.

4 L. Swemmer, H. Mmethi and W.Twine, 'Tracing the Cost/Benefit Pathway of Protected Areas: A Case Study of the Kruger National Park, South Africa', *Ecosystem Services*, 28 (2017), pp. 162–72.

livelihoods.[5] Agriculture, where it exists on the margins of the conservation zones, is mainly sub-subsistence in nature.

The entire lower third of the KNP is bordered by the Bushbuckridge local municipality. Recently declared to be a 'presidential poverty node', this area is home to extremely poor residents, more than 50 per cent of whom are unemployed.[6] Many arrived here when forcibly moved into the area under the policies that established the homelands of Gazankulu and Lebowa; many others were refugees from the 16-year-long, devastating Mozambican civil war. Historical trauma is impressed, so to speak, in the landscapes that border the park.[7]

Despite this legacy of rural dispossession, South Africa has become a global leader in wildlife ranching and safari hunting, with roughly 9,000 private game farms occupying 14 per cent of the total land area of the country, approximately 170,419 square kilometres.[8] Growth at this scale has been accompanied by a recent radical shift in land-use practices. Wildlife ranching, a far less labour-intensive farming practice, has come to replace agriculture and cattle farming in large sections of Limpopo province, entailing job losses and displacements of farm dwellers.[9] Any future attempts to address ecological fragmentation in this region would thus have to take account of a variety of regional land-management practices. These range from the business of well-capitalised game farms and private reserves to communal grazing areas falling under designated tribal authorities, and to the changing scientific management regimes of the KNP itself.

The greater KNP region is bracketed by rapidly growing peri-urban areas such as Bushbuckridge, Mkhuhlu, Acornhoek and Thulamahashe. Between these and the western fence of the protected areas, however, lie communal lands and sprawling villages under the administration of traditional authorities (see Figure 2). Faced with widespread loss of political support in the rural areas of Mpumalanga and Limpopo provinces, the current government has focused its wildlife economy planning on this narrow band of buffer-zone communities. Yet such attempts to include the rural poor in the economies of nature are also a response to a far older, destructive paradox: the violently inequitable ownership of natural resources in South Africa.[10] Dramatic historical dichotomies are evident in the patchwork of protected areas throughout north-eastern South Africa. Starkly visible differences between wealthy game lodges and impoverished surrounding communities are symptomatic of the wider inequalities that have earned South Africa the dubious reputation of having one of the most extreme Gini coefficients in the world.[11]

5 L. Swemmer, 'Towards Effective Benefit Sharing in SANParks' (unpublished conference paper, Savanna Science Networking Meeting, Kruger National Park, 2012).

6 Statistics South Africa, 'Local Municipality Statistics: Bushbuckridge', available at http://www.statssa.gov.za/?page_id=993&id=bushbuckridge-municipality, retrieved 28 July 2022.

7 J.M. Cockfield, 'Land, Settlement and Narratives of History in Northern Bushbuckridge, *c.* 1890–1970' (PhD thesis, University of Oxford, 2015); E. Ritchken, 'Leadership and Conflict in Bushbuckridge: Struggles to Define Moral Economies within the Context of Rapidly Transforming Political Economies (1978–1990)' (PhD thesis, University of the Witwatersrand, 1995).

8 W.A. Taylor, P.A. Lindsey and H. Davies-Mostert, 'An Assessment of the Economic, Social and Conservation Value of the Wildlife Ranching Industry and its Potential to Support the Green Economy in South Africa' (unpublished paper, the Endangered Wildlife Trust, Johannesburg, 2015).

9 M. Spierenburg and S. Brooks, 'Private Game Farming and its Social Consequences in Post-Apartheid South Africa: Contestations over Wildlife, Property and Agrarian Futures', *Journal of Contemporary African Studies*, 32, 2 (2014), pp. 151–72.

10 J. Carruthers, *The Kruger National Park – A Social and Political History* (Pietermaritzburg, University of Natal Press, 1995); D. Brockington, *Fortress Conservation: The Preservation of the Mkomazi Game Reserve, Tanzania* (Oxford, James Currey, 2002).

11 World Bank Gini Index, South Africa, available at https://data.worldbank.org/indicator/SI.POV.GINI?locations=ZA, retrieved 8 February 2022.

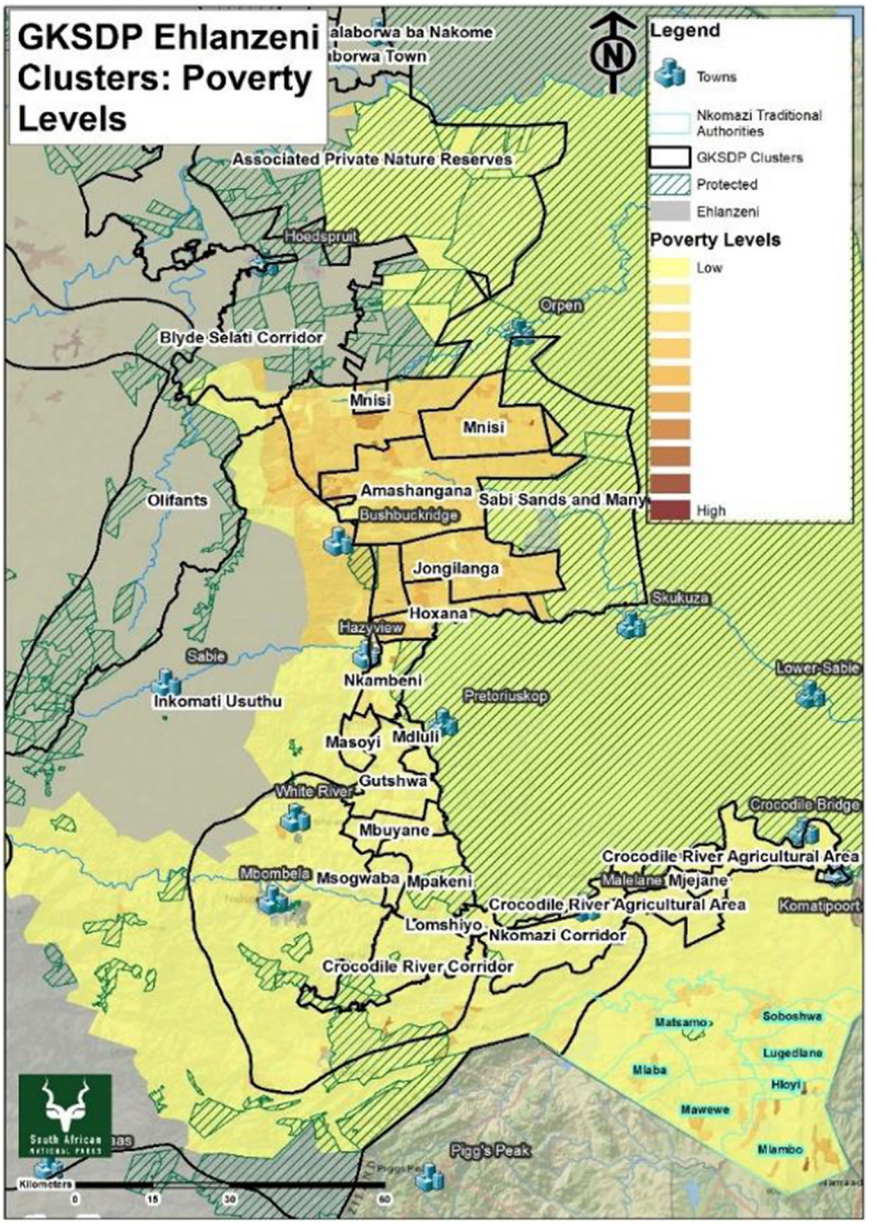

Figure 2. Traditional authorities and poverty levels in the K2C region. (Adapted from South African National Parks, *Greater Kruger Strategic Development Programme – Decision-Makers Summary* [unpublished report, 2020], p. 142.)

Ecological Fragmentation: The Veterinary Wildlife Assemblage

Inequalities of access to wildlife resources accelerated during the period of transition between late 19th-century settler colonial economies and an emerging, racialised and industrialised apartheid state. These are well-documented changes, and it is not our purpose to rehearse them now.[12] What is clear, though, is that, by the 1960s, in the South African

12 Useful but highly partisan perspectives are in U. de V. Pienaar, *Neem Uit die Verlede: Die Geskiedenis van die Laeveld en Ontstaan van die Krugerwildtuin* (Pretoria, Protea Books, 1990), and S. Joubert, *The Kruger*

lowveld, a racialised veterinary wildlife 'assemblage' had emerged, and the bordering territories of apartheid homelands, veterinary cordon fencing and military control became the armature of the KNP's self-conceived stable state.

We invoke the term 'assemblage' with caution, given the many unwieldy versions of the term in social theory after Deleuze.[13] In our case, it refers to the changing and complex conditions of association between animal and human bodies, conditions that have their own internal logic but that are also subject to the spatial logics of the apartheid era. Central to this process was an assemblage of institutions and actors in zones of disease control and attenuated life that stabilised the local boundaries of racial capitalism. This is not a simple matter of linear causality: the production of apartheid labour reserves alongside protected areas and the use of proscriptive veterinary regulation to govern the relation of human and animal agents served a function for the distributive economies of apartheid. That said, this system of interconnections had an apparent autonomy and resilience that allowed it to mutate into later periods and underpin the production of value in the wildlife industry after apartheid.

Late apartheid conservation practices produced a close convergence between veterinary control over animal movement and the racialised control over human populations. In the early 1960s, in response to the significant regional re-emergence of foot and mouth disease (FMD), the government introduced veterinary cordon fences on the western boundary of the KNP. These had a dual function: they controlled the movement of wildlife and cattle, imposing restrictions on local livelihoods; they also enabled an enhanced form of policing and population surveillance by dividing space into a series of articulated control zones.

FMD is a globally significant infectious disease affecting cloven-hoofed animals; it is most frequently transmitted to cattle from reservoir infections in wildlife such as buffalo, kudu and impala.[14] While it has a limited effect on production and mortality of cattle, the disease accounts for dramatic revenue losses for export beef producers. In the 1960s and again in 2000, FMD threatened to destabilise the largely white-owned commercial South African livestock industry. Southern African strains of the disease (SAT [Southern African Territories] 1, 2, and 3) were very virulent, transmitted mainly through the expanding herds of buffalo in the KNP and private reserves. Buffalo in KNP have an FMD seroprevalence of approximately 80–90 per cent.[15] Protecting the lowveld beef industry from transmission from this reservoir required strongly administered spatial segregation: to this day, veterinary red line zones are maintained 10–20 kilometres west of Kruger, where cattle are vaccinated three times a year. Veterinary cordon fences defined a disease buffer area that had a major impact on human and animal lives: it put paid to the historical migration of large herbivores

National Park: A History (3 volumes) (Johannesburg, High Branching, 2007). Still the most authoritative rewriting of Kruger's apartheid history is Carruthers, *The Kruger National Park*, which should now be read with S. Dlamini, *Safari Nation: A Social History of the Kruger National Park* (Athens, Ohio University Press, 2020). See also J. du Toit, K. Rogers and H. Biggs (eds), *The Kruger Experience: Ecology and Management of Savanna Heterogeneity* (Washington, Island Press, 2003).

13 B. Anderson and C. McFarlane, 'Assemblage and Geography', *Area*, 43, 2 (2011), pp.124–7.

14 F. Jori and E. Etter, 'Transmission of Foot and Mouth Disease at the Wildlife/Livestock Interface of the Kruger National Park, South Africa: Can the Risk Be Mitigated?', *Preventive Veterinary Medicine*, 126 (2016), pp. 19–29.

15 F. Jori, A. Caron, P.N. Thompson, R. Dwarka, C. Foggin, M. de Garine-Wichatitsky, M. Hofmeyr, J. Van Heerden and L. Heath, 'Characteristics of Foot-and-Mouth Disease Viral Strains Circulating at the Wildlife/Livestock Interface of the Great Limpopo Transfrontier Conservation Area', *Transboundary and Emerging Diseases*, 63, 1 (2016), pp. 58–70; K. Mogotsi, O. Kgosikoma and K. Lubinda, 'Wildlife–Livestock Interface, Veterinary Cordon Fence Damage, Lack of Protection Zones, Livestock Theft and Owner Apathy: Complex Socio-Ecological Dynamics in Foot and Mouth Disease Control in Southern Africa', *Pastoralism*, 6, 1 (2016), pp. 1–12.

and it restricted pastoral livelihoods to an area outside of which cattle owned by Africans could neither move nor be marketed.[16]

Apartheid biopolitical control depended on a segmentation of space that produced significant ecological fragmentation.[17] Fragmentation, understood here as the 'reduction of continuous habitat into smaller, spatially distinct patches immersed within a dissimilar matrix',[18] has been demonstrated to have a dramatically negative effect on biodiversity.[19] In producing patchy landscapes, fragmentation also multiplies the ecological edge effects that affect habitat connectivity, movement and resilience. However, most long-term ecological studies of fragmentation are based on tropical forest biomes, and, despite the evidence of these longitudinal surveys, the relationship between biodiversity loss and patch size continues to be a hotly debated topic.[20] For our purposes, complex ecological edge effects have their correlative in the complex political and social opportunities offered to resident human populations living in the interstices of these fragmented zones. Game reserve and veterinary cordon fences, in other words, are not simply barriers: they mark zones and gradients of waning authority.[21]

Early Post-Apartheid Kruger: Constituencies of Conservation

While the western edge of the KNP was defined by disease-control zones and buffer lands under customary control, the management of the iconic reserve until the late 1980s was a completely white affair.[22] In the 21st century, however, the potential for inclusion of communities to the west of Kruger in a wider wildlife economy has been radically redefined. Two historical forces fuelled this change: first, since 1994, a new democratic government has moved rapidly from a focus on resource needs of the general population – needs that can be met in part by the donation of state surpluses and the deployment of agricultural subsidies – to an argument based on rights to the environment. Secondly, these external drivers have been matched by significant, paradigmatic internal changes brought about by Kruger's innovative, post-1994 strategic adaptive management (SAM) policy.[23]

16 A. de Vos, G.S. Cumming, D.H. Cumming, J.M. Ament, J. Baum, H.S. Clements, J.D. Grewar, K. Maciejewski and C. Moore, 'Pathogens, Disease, and the Social-Ecological Resilience of Protected Areas', *Ecology and Society*, 21, 1 (2016); D. McGahey, 'Livestock Mobility and Animal Health Policy in Southern Africa: The Impact of Veterinary Cordon Fences on Pastoralists', *Pastoralism: Research, Policy and Practice*, 1, 1 (2011), pp. 1–29.

17 W. Beinart, 'Soil Erosion, Conservationism and Ideas about Development: A Southern African Exploration, 1900–1960', *Journal of Southern African Studies*, 11, 1 (1984), pp. 52–83; C. Shackleton and N. Gwedla, 'The Legacy Effects of Colonial and Apartheid Imprints on Urban Greening in South Africa: Spaces, Species, and Suitability', *Frontiers in Ecology and Evolution*, 8 (2021), pp. 1–12.

18 K.R. Crooks, C.L. Burdett, D.M. Theobald, S.R. King, M. di Marco, C. Rondinini and L. Boitani, 'Quantification of Habitat Fragmentation Reveals Extinction Risk in Terrestrial Mammals', *Proceedings of the National Academy of Sciences*, 114, 29 (2017), pp. 7635–40.

19 N.M. Haddad, L.A. Brudvig, J. Clobert, K.F. Davies, A. Gonzalez, R.D. Holt, T.E. Lovejoy, J.O. Sexton, M.P. Austin, C.D. Collins, W.M. Cook *et al.*, 'Habitat Fragmentation and its Lasting Impact on Earth's Ecosystems', *Science Advances*, 1, 2 (2015), pp. 1–9.

20 L. Fahrig, V. Arroyo-Rodríguez, J.R. Bennett, V. Boucher-Lalonde, E. Cazetta, D.J. Currie, F.Eigenbrod, A.T. Ford, S.P. Harrison, J.A. Jaeger and N. Koper, 'Is Habitat Fragmentation Bad for Biodiversity?', *Biological Conservation*, 230 (2019), pp. 179–86.

21 For a prescient anticipation of this perspective, see I. Hofmeyr, 'Nterata'/'The Wire': Fences, Boundaries, Orality, Literacy', *International Annual of Oral History* (1990), pp. 69–91.

22 J. Cock and D. Fig, 'From Colonial to Community Based Conservation: Environmental Justice and the National Parks of South Africa', *Society in Transition*, 31, 1 (2000), pp. 22–35. For critical revisions of this history, however, with reference to black tourism, see E. Teversham, 'The Nature of Leisure in the Manyeleti Game Reserve for Africans, South Africa, 1967–1985', *International Journal of the History of Sport*, 30, 16 (2013), pp. 1877–88; and Dlamini, *Safari Nation.*

23 D.J. Roux and L.C. Foxcroft, 'The Development and Application of Strategic Adaptive Management within South African National Parks', *Koedoe*, 53, 2 (2011), pp. 1–5.

SAM was first tested in Kruger's rivers research programme in the 1980s. The policy's undergirding was complexity theory, and it introduced a high degree of flexibility to natural resource management, embedding it for the first time within the wider social–ecological landscape mosaic.[24] Uniquely, the park was forced to begin seeing itself within the context of a diversity of upstream users.

Though it has much to recommend it, SAM has struggled to match its approach towards achieving ecosystem-scale heterogeneity and biodiversity goals with an understanding of social drivers. Despite the fact that post-apartheid South Africa became a signatory to the 2010 Nagoya protocol, further shifting the idea of conservation benefits from a needs-based to a rights-based discourse, post-apartheid Kruger moved slowly to expand its role beyond that of a donor of surpluses.

One of the biggest challenges facing South Africa National Parks (SANParks) was how to move beyond older forms of economic beneficiation to a wider understanding of 'constituency building' for conservation.[25] What was needed, in other words, was a more nuanced calculation of ecosystem service values beyond a narrowly monetised focus on incorporation into Kruger's wildlife economy penumbra.

To engage communities fully in the benefits of the Kruger-based wildlife economy, SANParks realised around 2010 that they could no longer avoid addressing certain long-standing historical suspicions on the part of border communities: those attached to unjust past practices such as clumsy veterinary interventions in the 1940s[26] and the failure to compensate communities for crops and livestock lost to elephants and carnivores.[27] Given this legacy of historical injustice, KNP authorities in 2014 reached the dramatic conclusion that no progress was possible without appropriate reparations for traumatic past losses. In fully researched cases, SANParks concluded, it might be possible to make amends through direct cash compensation for historical damage-causing animal losses.[28] With this significant proposal, an overall economic calculus about benefits being extended to residents of the buffer zone was superseded by a recognition of rights and losses due to conservation policy. For conservation agencies, and the state generally, reparation for past injustices is key to the ideological management of an increasingly disaffected, jobless rural poor.

Fragmentation in Disguise: The Private Reserves

While the KNP has been the major player in the inclusion or exclusion of communities from the wildlife economy, an increasingly important role is being played by two other sectors that we will discuss in turn: private reserves and wildlife ranches. First, consider the 'Associated Private Nature Reserves' (APNR) (including Timbavati, Klaserie, Umbabat, Sabi Sand and Mala Mala, and Balule), the non-state game areas bordering Kruger, covering some 180,000 hectares. Most consist of consortia of private lodge owners with traversing rights over one another's territories. Since 1994, most have

24 H. Biggs, C. Breen, R. Slotow, S. Freitag and M. Hockings, 'How Assessment and Reflection Relate to More Effective Learning in Adaptive Management', *Koedoe*, 53, 2 (2011), pp. 15–27.

25 L. Swemmer, R. Grant, W. Annecke and S. Freitag-Ronaldson, 'Toward More Effective Benefit Sharing in South African National Parks', *Society and Natural Resources*, 28, 1 (2015), pp. 4–20.

26 D. Bunn, 'The Museum Outdoors: Heritage, Cattle, and Permeable Borders in the South-Western Kruger National Park', in I. Karp *et al.* (eds), *Museum Frictions: Public Cultures/Global Transformations* (Durham, Duke University Press, 2006), pp. 357–91.

27 B. Anthony, 'The Dual Nature of Parks: Attitudes of Neighbouring Communities towards Kruger National Park, South Africa', *Environmental Conservation*, 34, 3 (2007), pp. 236–45.

28 B.P. Anthony and L. Swemmer, 'Co-Defining Program Success: Identifying Objectives and Indicators for a Livestock Damage Compensation Scheme at Kruger National Park, South Africa', *Journal for Nature Conservation*, 26 (2015), pp. 65–77.

dropped their fences with the KNP, allowing free movement of animals across a considerably larger habitat.[29]

Many lodges within the APNR cater to high-income tourists. Consider the case of Royal Malewane, an exemplary luxury safari lodge within the Thornybush Private Nature Reserve that charges up to R80,000 (roughly US$5,300) per person per night. But what precisely is the product offered by such private reserves? In essence, it is what recent geographers have called 'encounter value'[30], where the commodity is exclusive proximity to a living, often dangerous animal, evidently unenclosed and alert to its environment. Delivery of this product is enhanced in the private reserves by a kind of human framing effect: in the person of a safari guide who stages, mediates and explains the uniqueness of the encounter, and a black (almost inevitably) tracker, who, deploying apparently primal skills, finds and knows the animal. In the safari worlds of South Africa and east Africa, with their settler colonial antecedents, these two forms of expert framing often map closely on to ethnic categories.

Thornybush was one of the last private reserves to have doggedly resisted pressure to drop its fences. To this day, it is still a relatively small reserve of 14,000 hectares. The perceived advantage of this modest, enclosed space was that guides were able to deliver regular spectacular sightings. Inevitably, the closed nature of the system (allowing private access to wildlife value) produced a vicious differential equation between its conservation management strategy, on the one hand, and its wildlife tourism project on the other. Until very recently, the reserve struggled to make trade-offs between the two.

Some ten years ago, a seminal study of the elephant population in Thornybush examined the effects of an intervention in which all adult female elephants were kept on porcine *zona pellucida* contraception.[31] Lionesses, too, were regularly darted with contraceptives to slow the breeding rates of prides, which were beginning to decimate expensive plains game stock.[32] What this study revealed were more subtle but disturbing changes in elephant herd dynamics. To make matters worse, it was by now evident that the wildlife-viewing product could be sustained only by offering sightings of lion cubs and elephant calves. Without attendant younger animals, the charismatic megafauna appeared uncomfortably close to an engineered zoo population. Tourism, therefore, determined the inevitable next step: removal of a portion of the female lion and elephant population from contraception so that some of them could breed.

The case of Thornybush underlines the importance of biopolitics in the maintenance of wildlife economic value. In the multi-species assemblages that constitute safari tourism, spacing of lively animal commodities and tourists is a key way in which encounter value is assured. However, while smaller enclosed spaces deliver better sightings, this produces a biopolitical problem that can be solved only by engineering the animal population.[33]

Thornybush is exemplary of the problem of maintaining local wildlife value in the context of international tastes in safari viewing. Its oscillation between urgent population management and allowing for controlled breeding is characteristic of the more general, savage dialectic faced by all engineered ecosystems within the tourist wildlife economy: the

29 U. Kreuter, M. Peel and E. Warner, 'Wildlife Conservation and Community-Based Natural Resource Management in Southern Africa's Private Nature Reserves', *Society and Natural Resources*, 23, 6 (2010), pp. 507–24.

30 M. Barua, 'Nonhuman Labour, Encounter Value, Spectacular Accumulation: The Geographies of a Lively Commodity', *Transactions of the Institute of British Geographers*, 42, 2 (2017), pp. 274–88.

31 M.J. Bates, 'Endocrine Correlates of Free-Ranging African Elephant (Loxodonata Africana) Treated with Porcine Zona Pellucida Vaccine' (PhD thesis, University of Pretoria, 2011).

32 The term 'plains game' refers to common open savanna species such as impala, kudu, sable, eland, zebra, wildebeest and so on.

33 D. Lulka, 'Stabilizing the Herd: Fixing the Identity of Nonhumans', *Environment and Planning D: Society and Space*, 22, 3 (2004), pp. 439–63.

need to produce a kind of 'closed openness'. This delicate, paradoxical balance is also profoundly vulnerable to what might be described as the problem of the visible fence. In fact, to maintain their high-end tourist product, several APNR reserves maintain a careful fiction that the fence does not exist. In the Kapama private game reserve, for instance, safari vehicles on game drives are normally forbidden to follow animals in the direction of the boundary fence. In cases where a fence appears in publicly posted photos by guests, the safari guides responsible have sometimes been dismissed from service.[34]

By the 1990s, private reserves had maximised the value of their wildlife-viewing product by claiming exclusive rights over rich areas. With the opening up of the APNR, however, and the dismantling of boundary fences with Kruger, those exclusive rights were no longer concretely defined. Instead, a series of elaborate, abstract viewing rights and procedures had to be put in place. Most open reserves now maintain invisible boundaries: they hold 'traversing rights' over neighbouring territories, with vehicle access to key episodes (lion kills, static leopard sightings) being negotiated in coded radio traffic between operators. Significantly, the most expensive reserves have now developed a new model: they maintain wide traversing rights but keep a core area for their exclusive use. Thus Londolozi, for instance, has 17,000 hectares of shared traversing space and 7,000 hectares where only their safari vehicles are permitted. Even more exclusively, Mala Mala guards 70 per cent of its territory by denying traversing rights to rivals, thus maintaining low vehicle densities at key sightings.

The problem of the fence, for private reserves, is part of a general problematic that defines commercial wildlife viewing in South Africa as opposed to, say, east Africa. While Kenya and Tanzania are facing increasing forms of ecological fragmentation, the safari tourism economies there are based to a far greater extent on the idea of wide-ranging travel and animal migration beyond boundaries.[35] For that reason, and given the persistent racialisation of the industry, the dominant discursive figure exemplifying both indigeneity and mobility in east Africa is that of the ethnically colourful Maasai pastoralist. In South Africa, by way of contrast, the association of blackness and landscape is expressed in an equally persistent but much more static rhetorical figure: the loyal Shangaan tracker. Ethnicity, once again, is a second-order signifier bolstering wildlife tourism values.

To what extent, then, may we speak of wildlife economy costs and benefits in the private reserves, independent of their ties to the KNP? Some nuanced recent studies in Mpumalanga and Limpopo provinces have suggested that this is not possible. Child *et al.* make a convincing case for the fact that foreign tourism does not distinguish between 'Kruger' and the 'Greater Kruger' region, and that the APNR reserves have their brand imprimatur imparted to them by proximity to the national park. But their argument goes even further: analysing the APNR, KNP and communal areas as one system is critical, they say, not just for understanding the regional economy as a whole, but also because if 'large [protected area] mosaics encompassing a range of markets, equity-holders, and management objectives represent systems with high functional diversity, then this attribute may lend to resilience over and above the buffering effect of size alone'.[36] Note the easy shift here between the discourse of landscape ecology and that of governance: a gain in functional diversity leads

34 Personal communication from two ex-Kapama safari guides to David Bunn, May 2018.

35 R. Boone and T. Hobbs, 'Lines Around Fragments: Effects of Fencing on Large Herbivores', *African Journal of Range and Forage Science*, 21, 3 (2004), pp. 147–58; M. Kesch, D. Bauer and A. Loveridge, 'Break On Through to the Other Side: The Effectiveness of Game Fencing to Mitigate Human–Wildlife Conflict', *African Journal of Wildlife Research*, 45, 1 (2015), pp. 76–87.

36 A. Chidakel, C. Eb and B. Child, 'The Comparative Financial and Economic Performance of Protected Areas in the Greater Kruger National Park, South Africa: Functional Diversity and Resilience in the Socio-Economics of a Landscape-Scale Reserve Network', *Journal of Sustainable Tourism*, 28, 8 (2020), p. 1102.

to system resilience, hence a mosaic of ecological management practices is seen to buffer the effects of sustained political shock.

But does a variety of wide-area management strategies, working across boundaries, help to stabilise systems, and is there enough consensus to produce ecological resilience? This is doubtful. Consider the complicated regional relationship between fencing, wildlife value and waterpoint management. For the private reserves, efforts to combat ecological fragmentation and promote corridor connectivity have come at a cost with respect to the management of the lively commodities that are their stock in trade. Nowhere is this more dramatically apparent than in the deep contradictions around artificial watering points. As David Bunn and others pointed out decades ago, the introduction of artificial waterholes played a critical role in the development of the South African safari tourism industry.[37] Installed in increasing numbers in response to the dominant misperception that savannas were drying out, artificial waterholes became an important symbol of public donation and a landscape-based mechanism for organising game-viewing opportunities. In the early post-apartheid period, however, the new savanna science began to draw connections between installed waterpoints, ecological fragmentation and declining biodiversity, especially of rare antelope.[38] In the same period, conservation authorities in Kruger began an extensive programme of borehole decommissioning and earthen dam demolition with the wider intention of managing the negative effects of unusual animal population concentrations.[39] For the APNR, ironically, this produced a crisis of value: with the fences gone and wider animal migrations now opening up, private reserves were increasingly dependent on waterholes as predicable attractants for charismatic fauna. Waterholes, to put it in Žižek's terms, were the *point de capitan* of the entire ideology and economy of the private game-viewing industry.[40] Therein lay another massive problem: with Kruger's surface waterpoints being systematically removed, megaherbivores such as elephants began to crowd in increasing numbers into the APNR. The ecological effects of this soon became dramatically apparent: lodge owners and tourists began to complain about an apparently ravaged landscape, with widespread destruction by elephants of the iconic large trees that formed such a key point of aesthetic reference for safari tourism.[41]

By 2015, the new stable state occasioned by fence removal between APNR properties and the KNP, allowing for 'free' animal movement, had collapsed. In his 2015 commissioned ecological survey, Mike Peel noted that 'an over-supply of water in protected areas adjacent to the KNP … affects water infiltration, run-off, grass cover, [and] species composition'.[42] He also estimated a frequency of one water point per 731 hectares in the APNR as opposed to one water point per 51,440 hectares in Kruger and proposed an urgent equalisation of water availability between the APNR and the KNP, closing more in the former, to protect charismatic tree species. For the proximity economies of the private reserves, dependent on predictable sightings at waterholes, that was never to be an option.

37 D. Bunn, 'An Unnatural State: Tourism, Water, and Wildlife Photography in the Early Kruger National Park', in W. Beinart and J. McGregor (eds), *Social History and African Environments* (Oxford, James Currey, 2003), pp. 199–219.

38 R. Harrington, N. Owen-Smith, P. Viljoen, H. Biggs, D. Mason and P. Funston, 'Establishing the Causes of the Roan Antelope Decline in the Kruger National Park, South Africa', *Biological Conservation*, 90, 1 (1999), pp. 69–78.

39 I. Smit, 'Systems Approach towards Surface Water Distribution in Kruger National Park, South Africa', *Pachyderm*, 53 (2013), pp. 91–8.

40 S. Žižek, *The Sublime Object of Ideology* (London, Verso, 1989).

41 Personal communication, share block owners, Balule Nature Reserve, Wits Rural Facility, May 2017; see also M. Peel, 'Ecological Monitoring: Association of Private Nature Reserves 13th Joint Report' (2015), available at http://umbabat.com/wp-content/uploads/2019/04/APNR-Ecological-Report-2015.pdf, retrieved 29 July 2022.

42 Peel, 'Ecological Monitoring', p. 82.

Elephant population management, too, remains one of the most contested issues in the calculation of biodiversity and economic values in the lowveld. Indeed, until very recently, savanna scientists tended to fall into one of two camps: those who believed that active elephant population management was necessary to secure biodiversity and prevent localised extinctions, and those who insisted that not enough was known about metapopulation dynamics. Indeed, it is only in the last five years that any kind of consensus could be reached on the wide area dependencies of elephant populations: that elephant movement in the landscape is heavily dependent on surface water, and then differentially for bulls and maternal herds.[43] In this dialectic between the movement of highly social megaherbivores, tourist expectations and a patchwork of management priorities, we have the essence of the problem of the veterinary wildlife assemblage, with each human and animal component moving in a complex but non-linear lockstep.

Fragmentation, Genetic Segregation and Wildlife Ranching

A third major actor in the wildlife economy is the wildlife ranching sector. South Africa has the largest game-ranching industry in the world, with about 7,000 farms over approximately 170,419 square kilometres.[44] This extraordinary change from agriculture to wildlife-based production began in the late apartheid years with the withdrawal of government agricultural subsidies and the introduction of the Game Theft Act (1991).[45] The latter defined ownership rights for consumptive use of animals in adequately enclosed areas, and this led to an initial boom in the fencing in, breeding and selling of plains game for stocking the newly converted lands. As that initial surge dwindled, game ranchers turned to other niche markets: to high-value species such as Roan (*Hippotragus equinus*) and Sable (*Hippotragus niger*) antelope, and to speculation in very particular kinds of selective breeding, for an international hunting industry increasingly obsessed with horn length of trophy animals and intrigued by new colour variants. Between 2012 and 2016, this new focus on breeding special strains for a captive market drove prices up rapidly.

Hunting, whether for trophies or meat, contributes some R5.4 billion annually to the South African economy, supporting around 17,685 jobs.[46] Since 2003, however, South African ranchers have been changing tactics to accommodate what until recently seemed like an apparently insatiable global demand for high-value trophy animals and hybridised or recessive colour-variation animals. Chief among these are large horned, disease-free Cape Buffalo, Roan, Sable, Kudu, and Livingstone's Eland, and rare, specially bred colour variants such as Golden Wildebeest, King Wildebeest, Golden Gemsbok and Black Impala. Many of these breeding enterprises were highly speculative.

The South African wildlife ranching industry is regarded with mixed admiration and suspicion by international conservationists. In response to criticism, defenders like Peter

43 Smit, 'Systems Approach towards Surface Water Distribution'; R.M. Cook and M.D. Henley, 'The Management Dilemma: Removing Elephants to Save Large Trees', *Koedoe*, 61, 1 (2019), pp. 1–12; S.R. Loarie, R.J. van Aarde and S.L. Pimm, 'Fences and Artificial Water Affect African Savannah Elephant Movement Patterns', *Biological Conservation*, 142, 12 (2009), pp. 3086–98; J.O. Abraham, E.R. Goldberg, J. Botha and A.C. Staver, 'Heterogeneity in African Savanna Elephant Distributions and their Impacts on Trees in Kruger National Park, South Africa', *Ecology and Evolution*, 11, 10 (2021), pp. 5624–34.

44 W.A. Taylor, P.A. Lindsey and H. Davies-Mostert, 'An Assessment of the Economic, Social and Conservation Value of the Wildlife Ranching Industry and its Potential to Support the Green Economy in South Africa' (unpublished paper, the Endangered Wildlife Trust, Johannesburg, 2015).

45 J. Carruthers, '"Wilding the Farm or Farming the Wild"? The Evolution of Scientific Game Ranching in South Africa from the 1960s to the Present', *Transactions of the Royal Society of South Africa*, 63, 2 (2008), pp. 160–81.

46 M. Saayman, P. van der Merwe and A. Saayman, 'The Economic Impact of Trophy Hunting in the South African Wildlife Industry', *Global Ecology and Conservation*, 16 (2018), pp. 1–9.

Oberem, president of Wildlife Ranching South Africa, claim that the post-apartheid wildlife ranching industry 'has increased areas of conservation from 6 million hectares (state owned) – to 28 million hectares'.[47] If accurate, this would be an impressive statistic with a substantial impact on biodiversity. However, game ranching market speculation in Limpopo province has come at a price: to protect these natural assets, many investors can no longer afford the luxury of free-roaming animals. Ranching, in many areas, is being replaced by intensive farming of penned animals – treated for ectoparasites, fed supplements and defended against predation. High-security fencing is used, and predators such as jackal and hyena are ruthlessly exterminated. Many of the gains of the past decade – with the acreage of protected areas expanded through a mixture of conservancies, private game reserves and game ranching – are now being undermined by a new kind of aggressive partitioning: the transformation of ranches into internally divided breeding paddocks.[48]

Unlike in east Africa, where the wildlife tourism product was rhetorically associated with nomadism and migration, South African conservationists fashioned their protected area management strategies around control assemblages: exclusion of native cattle, strong fencing, veterinary control over epizootic diseases and the racialised segregation of human populations. Built on that history, South Africa's wildlife ranching industry is a startling example of more recent mutations in capitalist economies of nature: increasingly, 'animal bodies represent important sites for the accumulation of capital', and local ranchers have enthusiastically embraced the latest techniques in quantitative genetics and farm animal genomics.[49] Moreover, intensive breeding for horn length and colour require heavily managed environments. Nowhere is this better evidenced than in the breeding of rare colour varieties of the blue wildebeest (*Connochaetus taurinus*), called 'golden wildebeest'. When conservation authorities relaxed restrictions on breeding of colour-variant game animals, the market for specially bred animals boomed. Breeding requires specialised procedures, but, unlike cattle farmers, game ranchers did not have access to 'estimated breeding values', and so their solutions were limited to spatial ones: heterozygous genotype male wildebeest (carriers of the golden hide recessive gene) had to be physically separated from homozygous individuals and kept in small, defended pens.[50]

Placing together these solutions for the biopolitical management of wildlife and humans, we have a dramatic indication of the problems inherent in smallholder entrepreneurs entering the wildlife industry. Value, in each instance, involves a complex differential equation in which landscape aesthetics, encounter values, the visibility of fences, and genetic stocking are managed simultaneously in spatially segmented, highly capitalised corporate ventures.

South Africa's speculative game-animal markets exaggerated the effects of ecological fragmentation; they were also very risky, with boom and bust logics. Early adherents made massive profits, but, as of five years ago, international controversy over safari hunting practices has led to major US safari hunting clubs (such as Boone and Crockett, or the Dallas Safari Club) withdrawing support for the breeding of trophy colour-varied animals. The price of these and other variants has plummeted.[51] Golden wildebeest days, it seems, are over, and Covid-19 travel restrictions have put a final nail in the coffin of the industry.

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47 P. Oberem, 'SA Hunters: A Response from WRSA President: Dr Peter Oberem', press release, *Wildlife Ranching SA*, 21 February 2015.

48 J.D.P. Bothma and N. van Rooyen (eds), *Intensive Wildlife Production in Southern Africa* (Pretoria, van Schaik Publishers, 2005); Spierenburg and Brooks, 'Private Game Farming and its Social Consequences'.

49 L. Holloway and C. Morris, 'Genetic Technologies and the Transformation of the Geographies of UK Livestock Agriculture: A Research Agenda', *Progress in Human Geography*, 33, 3 (2012), p. 319.

50 A. Kotze, J.P. Grobler and P. Buduram, 'The Application of Genetic Markers in Game Farming in South Africa', *Proc. 7th World Cong. Genet. Appl. Livestock Prod., Montpellier, France* (2002), pp. 19–23.

51 A. Hart, 'Conservation Versus Profit: South Africa's "Unique" Game Offer a Sobering Lesson', *The Conversation*, Melbourne, 14 August 2017.

The DEA's biodiversity economy strategy predicted wildlife industry growth rates of up to 14 per cent per year. [52] Clearly, these are very questionable numbers. Yet they speak the discourse of a state agency enamoured with an industry that it continues to misunderstand. Buying into the myth that rare game breeding amounts to a more productive use of land, the state itself then begins to verge on repeating an older argument: that communal lands are the site of inefficient kinds of peasant farming, overuse and degradation.[53] What this rhetoric suggests is that unproductive peasants can be drawn back into a newly resuscitated and productive agricultural economy through the mechanism of the wildlife economy. This is the fantasy that many states tell themselves when dealing with failing rural economies. However, those who live on the edge of protected areas, no matter how remote, are tied to urban areas through value chains, migration and remittance economies along a rural–urban continuum.[54] For states like India or South Africa, using the rhetoric of environmentalism in support of modernising nationalist agendas, the peripheral poor apparently have to become entrepreneurial and productive or risk partial incorporation into the lowest ranks of workers in the safari economy – as guides or picturesque labour.[55] Repeating the mistakes of the past, government sees the rural poor as a special case, somehow distinct from the urban economy, requiring interventions based in nature.

A Slippery Slope: From Wildlife to Biodiversity Economy?

In 2014, the South African government abruptly changed its objectives for the economic renewal of rural South Africa, focusing on a more general 'biodiversity economy'. When international and neoliberal discourses of nature advance biodiversity as a general good, this is often combined with an understanding that increased biodiversity means increased heterogeneity and enhanced resilience. But what does this mean in the calculation of value on the ground and in the increasing pressure on rural communities to convert their communal lands to 'profitable' savanna game reserves?

Again, it is instructive to consider the case of Bushbuckridge. In 2013, the DEA commissioned what it called the 'Bushbuckridge Master Plan for Growing the Wildlife Economy'.[56] According to the plan, most of Bushbuckridge falls within the 'Heavily Modified/Transformed' biodiversity conservation land-use categories. There are two points of importance here. First, this example is typical of how development agencies tend to base their calculation of value, within a general biodiversity economy, on a functionally bankrupt set of descriptive land-use categories deployed by consultants.[57] However, to link landscape pattern and ecological function in a meaningful way requires that we dispense with a simple reliance on land-use categories and adopt, instead, a more nuanced understanding of the link between land cover and heterogeneity.

52 Department of Environmental Affairs, Republic of South Africa, keynote address by Minister Edna Molewa, MP, South African minister of water and environmental affairs at Wildlife Ranching gala dinner, 29 October 2012.

53 M. Hay, 'South Africa's Land Reform in Historical Perspective: Land Settlement and Agriculture in Mopani District, Limpopo' (PhD thesis, University of the Witwatersrand, Johannesburg, 2015).

54 M.R. McHale, S.T. Pickett, O. Barbosa, D.N. Bunn, M.L. Cadenasso, D.L. Childers, M. Gartin, G.R. Hess, D.M. Iwaniec, T. McPhearson and M.N. Peterson, 'The New Global Urban Realm: Complex, Connected, Diffuse, and Diverse Social–Ecological Systems', *Sustainability*, 7, 5 (2015), pp. 5211–40.

55 P. Ghosh and A. Ghosh, 'Is Ecotourism a Panacea? Political Ecology Perspectives from the Sundarban Biosphere Reserve, India', *GeoJournal*, 84, 2 (2019), pp. 345–66.

56 Linked Environmental Services, 'Growing the Wildlife Economy in Bushbuckridge: Master Plan Prepared for the Department of Environmental Affairs, South Africa' (unpublished report, Bushbuckridge, 2013).

57 M.L. Cadenasso, S.T. Pickett and K. Schwarz, 'Spatial Heterogeneity in Urban Ecosystems: Reconceptualizing Land Cover and a Framework for Classification', *Frontiers in Ecology and the Environment*, 5, 2 (2007), pp. 80–88.

These are not abstract principles. Without a finer-scale land-cover understanding that includes reference to patches and discontinuity, whether in Tibet or Ecuadorian Amazonia, there will always be an implicit bias against the land management practices in communal areas.[58] All too frequently, the base value of communal lands is described through the use of rigid land-use categories derived from remote sensing, and most communal areas end up falling into the category of 'degraded' land. However, even the most nuanced forms of remote sensing (light detection and ranging, for instance) give no sense of the high dependency of vulnerable rural people on the provisioning services (for fuelwood, edible insects, building materials and so on) offered by these lands.[59] Data also suggest that species diversity (excluding large vertebrates) may often be higher in communal lands than in adjacent conservation areas.[60]

On the basis of estimates derived from questionable ecosystem services modelling, the Bushbuckridge master plan recommended a system of corridor planning that would integrate buffer-zone communities into the wildlife economy. In report after report, hired consultants have tried to persuade communities of improved financial outcomes if they (re)turn their communal lands to wildlife. A typical example is that of the Sabi Sand Wildtuin, which for many years has been attempting to persuade traditional authorities in border villages to incorporate their communal lands into the private game reserve. A closer look at ecosystem services calculations in various Sabi Sand reports shows that they are biased in favour of conversion to the wildlife economy and that this exaggeration is due mainly to the manipulation of carbon sequestration values. In consultant James Blignaut's assessment, for instance, the village of Newington C could expect a financial value of R6,896,772 if its communal lands (1,000 hectares) remained unchanged, and R33,003,942 if incorporated into Sabi Sand.[61] The difference depends on a weighted additional financial value based on assumptions regarding carbon sequestration and 'cultural services' if the land is converted. There is a zero return in these categories, he claims, if the status quo is maintained. This amounts to an extraordinary assumption that the lands have no existing cultural value prior to the addition of outside cultural services like hunting and tourism.

When the monetised rhetoric of ecosystem services is grafted on to the system of values implicit in ecological understanding of biodiversity, supported by medium-resolution remote sensing data, the argument in favour of a wildlife economy seems unanswerable. However, by not locating biodiversity values in their broader social–ecological contexts, planners and consultants assume a fragmented picture of the area that privileges conservative protected area management strategies.

58 V. Caballero-Serrano, J.G. Alday, J. Amigo, D. Caballero, J.C. Carrasco, B. McLaren and M. Onaindia, 'Social Perceptions of Biodiversity and Ecosystem Services in the Ecuadorian Amazon', *Human Ecology*, 45, 4 (2017), pp. 475–86.

59 L.M. Hunter, W. Twine and L. Patterson, '"Locusts Are Now Our Beef": Adult Mortality and Household Dietary Use of Local Environmental Resources in Rural South Africa', *Scandinavian Journal of Public Health*, 35, 69 (2007), pp. 165–74.

60 C.M. Shackleton, 'Comparison of Plant Diversity in Protected and Communal Lands in the Bushbuckridge Lowveld Savanna, South Africa', *Biological Conservation*, 94, 3 (2000), pp. 273–85; R. Smart, M.J. Whiting and W. Twine, 'Lizards and Landscapes: Integrating Field Surveys and Interviews to Assess the Impact of Human Disturbance on Lizard Assemblages and Selected Reptiles in a Savanna in South Africa', *Biological Conservation*, 122, 1 (2005), pp. 23–31.

61 J. Blignaut, 'Develop Methodology [*sic*] for the Valuation of Ecosystem Services for Communal Areas Adjacent to the Sabi Sand Game Reserve' (unpublished report [n.d.] for the *Deutsche Gesellschaft für Internationale Zusammenarbeit*).

Mirror Images: The Legal and Illegal Wildlife Economies

While the rural poor face ambiguous returns if they convert their communal lands, there is, of course, a much more direct point of access to wildlife economy wealth: illegal wildlife harvesting. In an uncanny parallel to the booming game farming and breeding industry, the massive recent increase in rhino poaching in South Africa threatens to destroy the very community conservation and beneficiation programmes that have been built up in the 30 years since apartheid. Thus two inflationary trajectories – the boom in wildlife ranching and in the illegal traffic in horn or ivory – march in close formation. Rhino poaching in South Africa has taken on dramatic proportions: between January 2006 and April 2016, roughly 5,460 animals were killed.[62] South Africa provides habitat for 79 per cent of all of Africa's rhinoceros, so it is on the frontline of the poaching conflict.[63]

The KNP bears the brunt of rhino poaching. Faced with this onslaught, it has increasingly turned to full-scale militarisation of its structures and processes. The massively enhanced military solution is an outcome, too, of donor funding focused on army patrolling and weaponry, and, despite the fact that South Africa does not have an official shoot-on-sight policy, substantial numbers of people are dying in this heightened conflict (47 poachers were killed in Kruger in 2013 and at least 30 in 2014).

Caught up in this deadly logic, SANParks has been criticised for encouraging a wider 'green militarisation' that has undermined the goals of conservation management.[64] Staff disillusionment has begun to set in, with increasing numbers of section rangers reporting stress fatigue.[65] The 'rhino wars' have also spawned an entire new industry of donor organisations, including the Howard Buffet Foundation, which poured in financial support for military solutions, including air support and drones and the establishment of a heavily defended intensive protection zone in southern Kruger. All this is accompanied by a widespread public rhetoric suggesting that we need to go to war in defence of rhinos and lock down our borders.[66]

For major lowveld wildlife ranchers and for the government itself, the spectacular rise of poaching seems to make a mockery of all post-apartheid social uplift programmes. For a nervous white public still unsure of the post-apartheid government's commitment to conservation, the solution lies in a return to hard boundaries and patrolled buffer zones. A torrent of abuse is now being directed against Mozambique, with active campaigns calling for the reinstallation of a strengthened border fence and the (extra-legal) introduction of shoot-on-sight policies for poachers in national parks. The KNP, which tried to reimagine itself as a champion of environmental equity, reparation and justice through its innovative

62 J. Rademeyer, 'Tipping Point: Transnational Organised Crime and the "War" on Poaching, Part I' (unpublished report, The Global Initiative against Transnational Organised Crime, Geneva, 2016).

63 D.B. Morais, D. Bunn, G. Hoogendoorn and K.C. Birendra, 'The Potential Role of Tourism Microentrepreneurship in the Prevention of Rhino Poaching', *International Development Planning Review*, 40, 4 (2018), pp. 443–61.

64 R. Duffy, 'Waging a War to Save Biodiversity: The Rise of Militarized Conservation', *International Affairs*, 90, 4 (2014), pp. 819–34; E. Lunstrum, 'Green Militarization: Anti-Poaching Efforts and the Spatial Contours of Kruger National Park', *Annals of the Association of American Geographers*, 104, 4 (2014), pp. 816–32; B. Büscher and M. Ramutsindela, 'Green Violence: Rhino Poaching and the War to Save Southern Africa's Peace Parks', *African Affairs*, 115 (2016), pp. 1–22. For some shocking parallels in Guatemala, see also M. Ybarra, '"Blind Passes" and the Production of Green Security Through Violence on the Guatemalan Border', *Geoforum*, 69 (2016), pp. 194–206.

65 B. Büscher, '"Rhino Poaching is Out of Control!" Violence, Race and the Politics of Hysteria in Online Conservation', *Environment and Planning A*, 48, 5 (2016), pp. 979–98.

66 J. Humphreys and M.L. Smith, 'The "Rhinofication" of South African Security', *International Affairs*, 90, 4 (2014), pp. 795–818.

projects to include the rural poor, finds itself suddenly implicated again in an anti-guerrilla warfare programme reliant on village informants and spies.[67]

These volatile discursive contexts associated with the illicit trade in South African wildlife tended to push conservationists and academics alike into radically opposed camps. On the one hand, advocates of firm, militarised management of rhino and elephant populations found themselves in the unpleasant company of a strident public calling for poachers to be shot on sight and prosecuted to the full extent of the law. On the other, political ecologists found themselves clashing directly with exhausted conservation managers speaking from the front lines.[68] These divides were at their most extreme in 2018 and 2019. For the next two years, however, rhino deaths in state reserves showed a steady decline, and officials began to claim success for their methods, especially for new kinds of spatial solutions such as the introduction of intensive protection zones and the relocation of animals away from the dangerous edges of Kruger.[69] To many opponents of Kruger's intensive anti-poaching programme, though, another interpretation was obvious: there were fewer poaching events because there were significantly fewer rhino.[70]

In 2020, two additional factors came into play: first, the full extent of official corruption and bribery within state conservation and veterinary departments was revealed in high-level court cases such as that of Rodney Landela, one of Kruger's most senior regional rangers and a shining star of black empowerment, who was caught allegedly red-handed and covered in rhino gore by his subordinate field rangers at a poaching event. Secondly, the impact of the Covid-19 pandemic on South Africa's nature-based tourism industry began to be felt to its full, devastating extent. Private reserves were shuttered and closed, many never to reopen,[71] and SANParks floundered as tourism revenue dropped by 90 per cent.[72] Ironically, the harsh restrictions on movement occasioned by the nationwide Covid lockdown had a further effect, exaggerating the 'anthropause'[73] and temporarily restricting the activities of rhino and elephant poachers.[74]

As recently as 2019, the DEA continued to advance the idea of a legal trade in animal body parts as a key component of its democratised wildlife economy: there was serious consideration of the legalisation of the rhino horn trade, and the government accelerated the issue of permits for export of lion skeletons for the bone trade.[75] The year 2021, in contrast, brought a significant official reversal: for the first time, the government broke ranks with those powerful local game ranchers seeking to legalise the trade in rhino horn. Barbara

67 W. Annecke and M. Masubelele, 'A Review of the Impact of Militarization: The Case of Rhino Poaching in Kruger National Park, South Africa', *Conservation and Society*, 14, 3 (2016), pp. 195–204.

68 J. Jooste and S.M. Ferreira, 'An Appraisal of Green Militarization to Protect Rhinoceroses in Kruger National Park', *African Studies Quarterly*, 18, 1 (2018), pp. 49–59.

69 Department of Forestry, Fisheries and the Environment, press release, 8 February 2022, available at https://www.dffe.gov.za/mediarelease/rhinopoaching_2021, retrieved 10 February 2022.

70 E. Smidt, 'Beyond Militarized Conservation: The Police Labour Regime and its Effects in the Kruger National Park' (PhD thesis, Erasmus University, Rotterdam, 2022).

71 A. Welz, 'The Pandemic has Undone South Africa's National Parks', *The Atlantic*, Boston, Mass., 7 June 2021, available at https://www.theatlantic.com/science/archive/2021/06/covid-19-tourism-conservation-south-africa/619091/, retrieved 1 July 2021.

72 M.K.S. Smith, I.P. Smit, L.K. Swemmer, M.M. Mokhatla, S. Freitag, D.J. Roux and L. Dziba, 'Sustainability of Protected Areas: Vulnerabilities and Opportunities as Revealed by COVID-19 in a National Park Management Agency', *Biological Conservation*, 255 (2021), pp. 1–13.

73 C. Rutz, M.C. Loretto, A.E. Bates, S.C. Davidson, C.M. Duarte, W. Jetz, M. Johnson, A. Kato, R. Kays, T. Mueller and R.B. Primack, 'COVID-19 Lockdown Allows Researchers to Quantify the Effects of Human Activity on Wildlife', *Nature Ecology and Evolution*, 4, 9 (2020), pp. 1156–9.

74 S.M. Ferreira, C. Greaver, C. Simms and L. Dziba, 'The Impact of COVID-19 Government Responses on Rhinoceroses in Kruger National Park', *African Journal of Wildlife Research*, 51, 1 (2021), pp. 100–110.

75 V.L. Williams, A.J. Loveridge, D.J. Newton and D.W. Macdonald, 'A Roaring Trade? The Legal Trade in *Panthera leo* Bones from Africa to East–Southeast Asia', *PLoS One*, 12, 10 (2017).

Creecey, the new minister of the renamed Department of Forestry, Fisheries and Wildlife oversaw the release of a massive specialist report that also recommended the end of captive breeding of lions for trophy hunting and the body parts trade. [76]

In the same period, the critiques of neoliberalism deriving from academic political ecology became more nuanced and less combative.[77] All parties to the debate about how best to combat rhino poaching have benefited from a next generation of sophisticated market research, which investigates the real economic principles underlying the demand-driven illicit wildlife trade in China and Vietnam.[78] For decades, donor-driven agencies gave tacit support to the understanding that consumption of rhino horn did not add up to a real exchange economy; instead, it tended to be seen as an irrational, fetishistic investment in products that had no therapeutic value by western standards. Demand reduction was thus driven by the desire to 'educate' Chinese or Vietnamese consumers about the lack of scientific evidence for such implicit value. Significantly, too, in the last three years, there has been a noticeable turn away from supply-side solutions, including a waning of a lobby, powerful until recently, for the legalisation of rhino horn and ivory trading. Poverty-based models for 'poachernomics' have now become more mainstream, though few have pressed these points home as we do, linking them to a failure at national scale to address youth unemployment.[79]

If we are to take seriously the old adage that the source of surplus value is the unacknowledged labour of workers, then the entire rhino horn exchange process is at one with a larger historical legacy: that condition in which apartheid narrowed the participation of black workers in the general economy to that of manual labour, leaving a catastrophic legacy of poverty which now – at least partly – enables the rhino poaching industries. In the end, solutions can be found only in complex, articulated approaches over time, with training programmes and funding for rural communities. SANParks and their affiliates have begun to move in these directions, sometimes without the support of the general public. Working with K2C, they have installed projects such as 'rhino ambassadors' in schools and have begun to imagine a variety of trans-boundary community-based natural resource management programmes designed to extend management and ownership to border communities in South Africa and Mozambique.[80] Unfortunately, the last decade of anti-poaching policing has produced such an institutionalised counter-insurgency culture that 'the Park's renewed focus on communities [all too often] instead re-centres communities as a target for surveillance'.[81]

Beyond Fragmentation? Zonal Conservation and Soft Surveillance

In this article, we have explored the paradoxes of managing an evolving wildlife economy in the K2C region, but many of the same complications are visible in large, protected area

76 Government of South Africa, Ministry of Environment, Forestry and Fisheries, *High-Level Panel Report for the Review of Policies, Legislation and Practices on Matters of Elephant, Lion, Leopard and Rhinoceros Management, Breeding, Hunting, Trade and Handling* (December 2020), available at https://www.dffe.gov.za/sites/default/files/reports/2020-12-22_high-levelpanel_report.pdf, retrieved 7 July 2022.

77 E. Lunstrum, N. Givá, F. Massé, F. Mate and P.L. Jose, 'The Rhino Horn Trade and Radical Inequality as Environmental Conflict', *Journal of Peasant Studies* (2021), doi: 10.1080/03066150.2021.1961130.

78 H.N. Dang Vu and M.R. Nielsen, 'Evidence or Delusion: A Critique of Contemporary Rhino Horn Demand Reduction Strategies', *Human Dimensions of Wildlife*, 26, 4 (2021), pp. 390–400.

79 E. di Minin, J. Selier, M. Louis and C.J. Bradshaw, 'Dismantling the Poachernomics of the Illegal Wildlife Trade', *Biological Conservation*, 265 (2022), https://doi.org/10.1016/j.biocon.2021.109418; R. Witter, 'Rhinos as "The Mine" and the Fugitive Meanings of Illegal Wildlife Hunting', *Conservation and Society*, 19, 3 (2021), pp. 139–49.

80 For a review of cross-border K2C and Kruger collaborations, see the 2022 Kruger to Canyons Biosphere project description, available at https://kruger2canyons.org/projects/, retrieved 29 July 2022.

81 Smidt, 'Beyond Militarized Conservation', p. 309.

landscapes globally. We conclude now with final, contextualising comments on the zonal administration of wildlife value in expanded protected areas generally.

Since the late 1980s, internationally, there has been a progressive move away from species-based conservation and towards wide-area ecosystem management.[82] Thus local K2C increases in contiguous protected areas echo a global trend inspired by the introduction of the Aichi 2020 biodiversity targets. Despite these gains, however, there are three major remaining hurdles limiting the entry of rural Africans into a wildlife economy based in expanded areas: a justifiable lack of enthusiasm for these supposed opportunities, failure on the part of national government to provide job creation training programmes for rural youth and fragmented governance of land restored to communities.

Barriers to entry into the lowveld wildlife economy are not, in the end, peculiar to the rural environment.[83] The myth of the resurgent smallholder farmer, ready in the wings, persists in state planning.[84] However, in the villages on the western edge of the APNR, while there is considerable investment in the idea of job opportunities in Kruger or the APNR, there is little enthusiasm for a future based in wildlife ranching.[85] What should be obvious, too, is that there is a minimal chance of a new generation of young black entrepreneurs being ready to develop safari tourist business offices in Bushbuckridge. As Schirmer and others have shown, there are '9.1 million young South Africans who now fall into the NEET [not in employment, education or training] category, [constituting] 44 per cent of the 20.6 million in this age group'.[86] Training programmes have failed to deliver the skills necessary for young entrepreneurs to enter the wildlife economy, and entry capital and financing requirements are simply too high. Put bluntly, no true democratisation of the regional wildlife economy is conceivable without a massive national effort first to address youth unemployment and training.[87]

What is clear, too, is that while there may already be land potentially available for an expanded wildlife economy, it is still politically contested. Delius and Beinart estimate that up to a million hectares in the former homelands now lie fallow, and successful land claims have restored additional large tracts that could potentially be used for wildlife.[88] None the less, over the past decade, the majority of lowveld land restitution settlements have been to

82 J. Hilty, G.L. Worboys, A. Keeley, S. Woodley, B.J. Lausche, H. Locke, M. Carr, I. Pulsford, J. Pittock, J.W. White, D.M. Theobald, J. Levine, M. Reuling, J.E.M. Watson, R. Ament and G.M. Tabor, *Guidelines for Conserving Connectivity through Ecological Networks and Corridors*, Monograph 30 (IUCN 2020); S.L. Maxwell, V. Cazalis, N. Dudley, M. Hoffmann, A.S. Rodrigues, S. Stolton, P. Visconti, S. Woodley, N. Kingston, E. Lewis and M. Maron, 'Area-Based Conservation in the Twenty-First Century', *Nature*, 586, 7828 (2020), pp. 217–27.

83 For a fundamental corrective, see S. Schirmer, 'Land Reform: The State We Are In', *African Studies*, 68 (2009), pp. 465–78; and S. Schirmer, 'White Farmers and Development in South Africa', *South African Historical Journal*, 52 (2005), pp. 82–101.

84 L. Gwiriri, J. Bennett, C. Mapiye and S. Burbi, 'Unpacking the "Emergent Farmer" Concept in Agrarian Reform: Evidence from Livestock Farmers in South Africa', *Development and Change*, 50, 6 (2019), pp. 1664–86.

85 Migration out of the wider Bushbuckridge region continues to play a major role. See C. Ginsburg, M. Collinson, F. Gómez-Olivé, M. Gross, S. Harawa, M. Lurie, K. Mukondwa, C. Pheiffer, S. Tollman, R. Wang and M. White, 'Internal Migration and Health in South Africa: Determinants of Healthcare Utilisation in a Young Adult Cohort', *BMC Public Health*, 21, 1 (2021), pp. 1–15.

86 S. Schirmer and S. Nkomana, 'South Africa's NEETS Crisis: Why We are Failing to Connect Young People to Work', unpublished report, Standard Bank Tutula Community Foundation (2021), p. 1, available at https://www.africaportal.org/publications/south-africas-neets-crisis-why-we-are-failing-connect-young-people-work/, retrieved February 2022.

87 R.F. Duffy, B. St John, B. Büscher and D. Brockington, 'Toward a New Understanding of the Links between Poverty and Illegal Wildlife Hunting', *Conservation Biology*, 30, 1 (2016), pp. 14–22; Lunstrum, Givá, Massé, Mate and Jose, 'The Rhino Horn Trade'.

88 W. Beinart and P. Delius, 'Smallholders and Land Reform: A Realistic Perspective', *CDE Viewpoints*, 5 (13 October 2018), available at https://www.africaportal.org/publications/smallholders-and-land-reform-realistic-perspective/, retrieved 28 July 2022.

communal property associations, often with 'bundled' rights. In almost all these cases, the past history of division has re-emerged in savage, post-settlement disagreements, as groups contest again the authority of local leaders to represent them.[89]

What patterns of governance do we see emerging in the global expansion of protected areas? While the original goals of wide-area management were focused on biodiversity conservation and the restoration of ecosystem services, they were unevenly applied to the increasing number of people living on the boundaries of these new conservation estates. Increasingly, following templates introduced by the International Union for the Conservation of Nature (IUCN), border communities found themselves reclassified as citizens of what became known as 'buffer zones'.

Buffer zone solutions are now being extensively applied in the new wide-area management strategies proposed for the greater KNP. For the past five years, SANParks has taken the lead developing an ambitious new Greater Kruger Strategic Development Programme (GKSDP), which seeks to 'unlock … rural economic development in the Greater Kruger landscape while securing the ecological health … of large, natural landscapes to ensure their sustainable use for the benefit of all South Africans'.[90] While the GKSDP grows out of earlier K2C corridor-planning templates, it focuses more on a massive, long-term exercise in stakeholder negotiation. It also mirrors the global trend towards zonal control and spatial partitioning that brings together nationalist development ideologies and a belief in the magical properties of the wildlife economy.[91] Latest proposals are for an interlocking set of intensive KNP surveillance zones (see Figure 3), and, in the wider region, there has been a significant expansion of zonal biometric control technologies. On Kruger's western edge, for instance, since 2016, private game reserves have partnered with Dimension Data, Cisco Systems and Japan's Nippon Telegraph and Telephone Corporation in a 'connected conservation' project that uses sophisticated real-time biometric tracking, a fence network with acoustic and thermal cameras, and regionally implanted metal detectors, linked to a Reserve Area Network that boasts a seven-minute response time to any rhino poaching event.[92]

Increasingly, the economic problems of managing expanded conservation space are solved by the division of wide areas into surveillance zones covered by infrared field cameras or drones. So, for instance, in a project commissioned by the Rhino Pride Foundation, the expanded conservation space is redefined in terms of perimeter risk and the field of view of remote, infrared sensing cameras operating in 'cover zones': '[t]he focus is on early detection of activity outside the perimeter … Any entry to within the secured perimeter is considered a failure'.[93]

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89 Perhaps the most controversial case of all was the R1.1 billion state purchase of the Mala Mala private game reserve in favour of the N'wandlamarhi community property association. On Mala Mala, see K. Ghedi Alasow, *Capitalism and Private Nature Reserves: The Taming of Mala Mala Land Claim* (Master's dissertation, University of Cape Town, 2020); for other Sabi Sand claims see M. Ramutsindela, 'Extractive Philanthropy: Securing Labour and Land Claim Settlements in Private Nature Reserves', *Third World Quarterly*, 36, 12 (2015), pp. 2259–72. For the Moletele land claim, see Hay, 'South Africa's Land Reform in Historical Perspective'.

90 South African National Parks, 'Greater Kruger Strategic Development Programme – Decision-Makers Summary' (unpublished report, 2020), p. xv.

91 E.T. Yeh, 'Transnational Environmentalism and Entanglements of Sovereignty: The Tiger Campaign Across the Himalayas', *Political Geography*, 31, 7 (2012), pp. 408–18.

92 For a partisan description of the Connected Conservation partnership, see the NTT Corporation site, https://hello.global.ntt/about-us/case-studies/connected-conservation.

93 Rhino Pride Foundation Sanctuary, *Turning the Rhino Poaching Tide with the Help of Surveillance Tech.: Rhino Sanctuary Stays One Step Ahead with Perimeter Protection*, Axis Communications, available at https://www.axis.com/files/success_stories/ss_tour_rhino_sanctuary_70380_en_1704_lo.pdf, retrieved 2 August 2022.

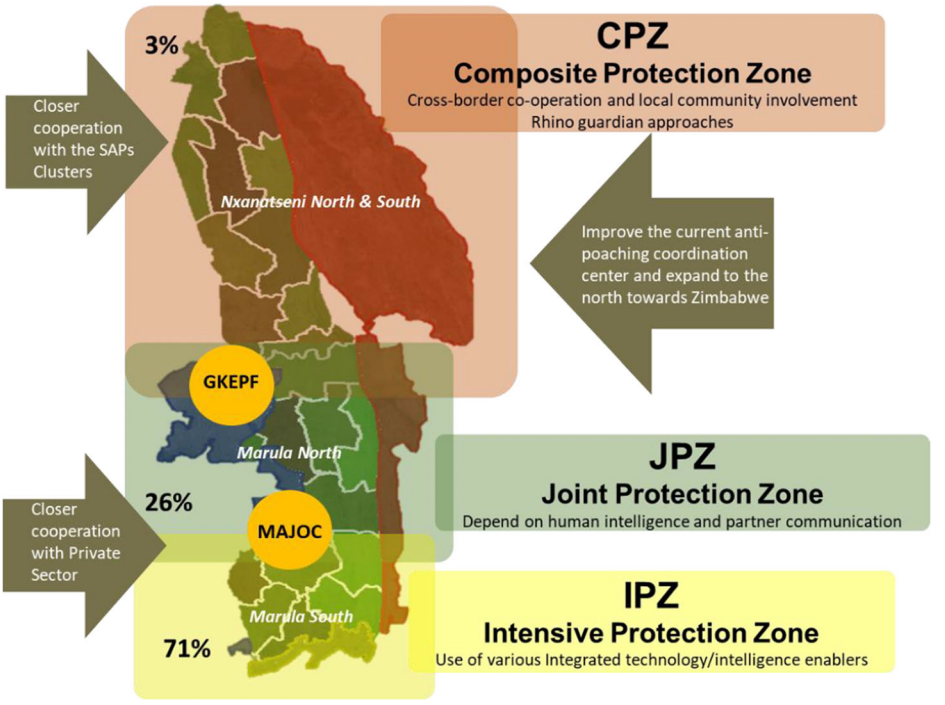

Figure 3. Proposed integrated Kruger National Park surveillance zones. (Adapted from South African National Parks, *Greater Kruger Strategic Development Programme – Decision-Makers Summary* [unpublished report 2020], p. 258.)

These kinds of biometric, 'soft' perimeter surveillance methods protect the capital investment in animal commodities. While they depend on a sophisticated set of risk hierarchy algorithms and machine learning that is applicable to the monitoring of both animal and human movement, they are also part of an epistemic shift globally to the use of soft controls through conservation buffer zones.[94] Animal values, in these systems, are secured within a surveillance landscape of reduced risk that also automates the classification of human agents in the border zones in one complex assemblage.

Conclusion

With the largest wildlife-ranching and hunting industries in the world, the fact that it is ranked third among all nations in terms of existing biodiversity and a post-apartheid constitutional process founded on equitable distribution of natural resources for its citizenry, South Africa seems to be a special case. That said, across a variety of spheres, the case of the wildlife economy in that country offers a series of bleak lessons about citizenship and nature under current global conditions. At the largest scale, in trans-frontier conservation areas and the K2C region, the inclusion of the rural poor is hampered by conceptions of risk that limit innovative conceptions of conservation co-management. More locally, in private

94 T. Miller, *Empire of Borders: The Expansion of the US Border Around the World* (London, Verso Books, 2019); T. Humle, R. Duffy, D.L. Roberts, C. Sandbrook, F.A. St John, and R.J. Smith, 'Biology's Drones: Undermined by Fear', *Science*, 344, 6190 (2014); E. Bondi, F. Fang, M. Hamilton, D. Kar, D. Dmello, V. Noronha, J. Choi, R. Hannaford, A. Iyer, L. Joppa, M. Tambe and R. Nevatia, 'Automatic Detection of Poachers and Wildlife with UAVs', in F. Fang, H. Tambe, B. Dilkina and A. Plumptre (eds), *Artificial Intelligence and Conservation* (Cambridge, Cambridge University Press, 2019), pp. 77–99.

reserves and ranches, the value of the wildlife product is still strongly dependent on spatial segmentation that undermines broader goals of biodiversity management. These fragmenting logics of closed openness are an outgrowth of older, apartheid-era veterinary controls.

While South African government agencies struggle to carve out job-creation programmes from the profits of a wildlife economy that they only partly understand, the rural poor find themselves under pressure from a faster-paced, inelastic economy: organised wildlife trafficking. These apparently distinct developments, we have argued, are part of one historical movement: a wider global moment, in which the monetising logics of ecosystem services fail to deliver a proper accounting of land, life, people and justly distributed natural resources, within a faltering system of national economic reconstruction. In the process, life in proximity to South Africa's protected areas is collapsed into a far more brutal general ledger, a logic of the buffer zone, of quick returns and of corruption, in which human and animal subjects are subsumed under the mantle of consumptive use.

Acknowledgements

Research for this article began with workshops co-ordinated by North Carolina State University's IMAGINE programme and the City Institute at the University of the Witwatersrand. Further research was supported by the University of the Witwatersrand, the US National Science Foundation, the US Fulbright programme, South African National Parks, and Arizona State University. The authors are grateful to Harry Biggs, Marisa Coetzee, Rina Grant and Nicholas Funda, all of South African National Parks, Robin Drennan and Noeleen Murray at Wits, and Wayne Twine and Cameron Watt of Wits Rural Facility.

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