# Islands and Bioregions: Global Reserve Design Models and the Making of National Parks, 1960-2000

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## Global Reserve Design Models and the Making of National Parks, 1960–2000

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One of the pivotal issues at the center of any nature conservation policy is the planning and selection of nature reserves. How big should they be? What is their appropriate form? Where should they be located? This chapter will take a closer look at two highly influential models for reserve design developed by experts at international nature conservation organizations. Both models were intended to be applied everywhere around the globe, from the abandoned "wilderness" of the US to the vast savannahs in the former African colonies and the dense jungles of South East Asia. Although the two models we investigate appeared within a period of only twenty years, the philosophies on which they were based differed greatly. In fact, the two models proposed very different utopian ideals for the protection of nature. Each pursued its own strategy on how to juxtapose the conservation of species and habitats with other land uses. The first global reserve design model we discuss featured in the *World Conservation Strategy* (1980) and advised countries to establish single large (SL) reserves where wildlands could evolve undisturbed by human influences. These guidelines were paralleled by a spatial representation that depicted nature reserves as islands, carefully sealed off from the surrounding land. The second model, on the other hand, pleaded for a conglomeration of several small (SS) protected areas, surrounded by semi-protected buffer zones and connected through corridors. This so-called bioregional approach stressed connectivity between islands and took adjacent lands, their use, and users explicitly into account.

In this chapter, we focus on the spatial logics that these two models represented, the kind of space they produced and the ways in which this space was managed and controlled. Drawing on the work of Timothy Luke (1995; 2001), we show that in practice both models, despite their different underlying philosophies, functioned as forms of *green governmentality* or *environmentality*. The notion of environmentality, in the way Luke proposed it, extends Michel Foucault's idea of governmentality to the environment. In the 1970s, according to Luke, experts at international organizations produced "the environment" as a new discursive and spatial domain for

political action. By classifying and organizing space as environment, moreover, experts put it under close surveillance and turned it into something they could easily govern, manage, and control. International organizations' global models for nature reserve design can be seen as instances of environmentality at work. Although experts advanced these models as scientific instruments, they clearly served a political function. Indeed, the two models we discuss produced and demarcated space as protected areas and as sites for conservation action and control. Although the two models organized space in different ways they both performed this disciplinary logic.

In this chapter, we will introduce the two models for reserve design one by one. We focus on the main differences between the two models by analyzing the scientific ideas and controversies that shaped them. Moreover, we look at the political and institutional contexts in which they were negotiated. To analyze the spatial logic that these models performed, we will take a close look at a concrete site where both models were employed on the ground: Chitwan National Park in Nepal. Further, we will compare and contrast Chitwan with Serengeti National Park in Tanzania, an iconic case that historians have studied in detail (e.g., Neumann 1998; Shetler 2007). We have selected Chitwan because conservation experts themselves have always used this space with its abundant wildlife and a rich biodiversity, as an example of successful conservation policy. At the same time, the park is located in one of the poorest parts of the world. Local populations living in adjacent lands depend on the parks' resources in order to meet their needs. As a result, Chitwan has repeatedly been at the center of struggles over land and resources.

Conservation experts presented the transition from the island model to bioregionalism as a fundamental paradigm shift from wildlife protectionism to a people-centered approach. On the ground, this shift went together with a reorganization of space. However, we argue that despite shifting rhetoric and new spatial arrangements, crucial aspects of conservation practice remained unchanged. As standardized systems for the organization, construction, and management of space for conservation, both models ignored local particularities and needs. In fact, by applying global models to a specific site, experts at international organizations generated tensions with local people over land ownership and the use of natural resources. In Chitwan National Park, bioregionalism only further restricted rather than enhanced local people's resource use.

Theoretical debates between experts about models for reserve design and the controversies that followed when international organizations applied these models on the ground are relevant to historians because they relate to the core of what nature protection is about. Nature reserves after all are the most visible and iconic products of conservation. Models for the design of reserves, moreover, reflect broader ideas about the priorities of conservation and the kind of nature that experts wish to protect.

## Diamond's Model and a Long Tradition of Single, Large Nature Reserves

In 1980, after several years of drafting, reviewing, and revising the International Union for the Conservation of Nature (IUCN), the leading science-based conservation organization published its *World Conservation Strategy*. This document, described by conservationists as the organization's "peak of achievement" and "most important single contribution in the history of IUCN" (Holdgate 1999:149), represented a joint effort with other major international players in the field of conservation and natural resource management: The UN Environmental Programme (UNEP), the World Wildlife Fund (WWF), the UN Educational, Scientific and Cultural Organization (UNESCO), and the UN Food and Agricultural Organization (FAO). The *Strategy* provided both an intellectual framework and a set of practical guidelines for conservation action. It made a clear statement about the ideal reserve design in word and image: "Generally, a large reserve is better than a small one. Preferable size and distribution patterns are shown in the left-hand column of figure C" (IUCN 1980:6). This "figure C" (our Figure 10.1) was taken directly from an article that North American ecologist Jared Diamond had published in 1975 (Diamond 1975).

The model itself is very abstract. It is composed of stand-alone circles or collections of circles of different sizes, representing bounded nature reserves – "islands" of protected nature sealed off from unprotected areas. Vertically, the model describes several designs (A–F), in which the options on the left are "better" than the ones directly opposite. Horizontally, in turn, the two options in A should be preferred to B and so on, with F being the worst possible design of the described options. In general, a SL island (A left) is portrayed as ideal and as better than a single smaller or SS ones. If SS reserves are necessary, these should be clustered in close proximity or connected rather than dispersed. A small, elongated reserve is shown as the worst possible design (F right).

For conservationists, it was the metaphor of reserves as large isolated islands that corresponded well with their conceptualization of protected areas as large sanctuaries kept safe from human disturbances. The graphic model that found its way to the *World Conservation Strategy* resulted from a long tradition in international conservation circles to stress the necessity of large protected areas. Diamond's model, in other words, scientifically legitimized an idea that had been dominant for several decades.

Since at least the 1940s, conservationists aimed to protect the largest possible areas from human development and exploitation (Kingsland 2002:10). Already in 1948, when IUCN was founded, protected areas and parks were recognized as the key tool for implementing conservation on a global scale. And, early on, conservationists emphasized the universal value of *large* protected areas. With this approach, they tried to control the potential harm done to nature by uncontrolled human behavior in remote places through

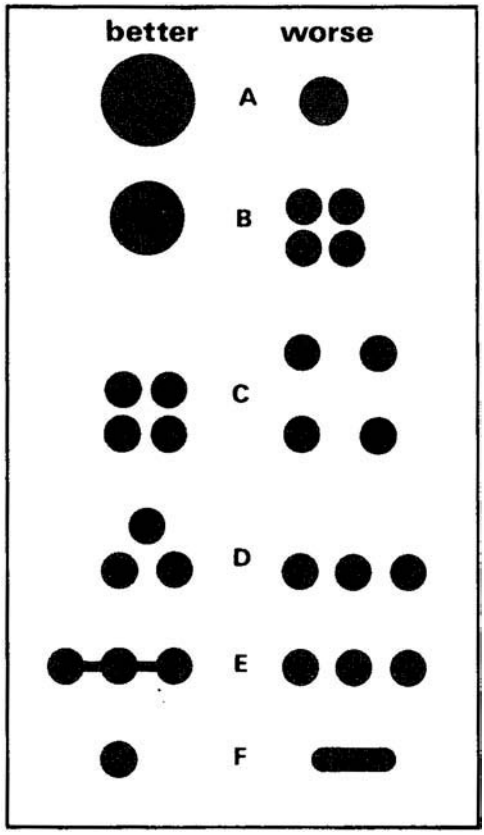


*Figure 10.1* Diamond's model (IUCN 1980).
Source: Courtesy by Elsevier.

preserving "undisturbed" areas in one piece. Based on the *Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere*, the aim was to protect "areas extensive enough to assure [wild species] from becoming extinct through any agency within man's control" (Pan American Union 1940:2).

Building on these ideas, in the 1960s, large national parks were increasingly promoted as prestige objects both for the global north and south. When, in 1961, the UN issued a resolution to prepare an official list of national parks and equivalent reserves, the idea was hailed by IUCN. It marked the beginning of the work of IUCN's Commission on National Parks and Protected Areas on the *List of National Parks* (IUCN 1962), in which a global taxonomy of reserves was created (Wöbse in Gissibl, Höhler, Kupper 2012:151). In 1962, at the First International Congress on National Parks, national parks were termed the "crown jewels" of conservation (Adams, IUCN,

and UNESCO 1964:15). The congress further decided that national parks needed to "be large enough to be self-contained units" (p. 95) and that at least "one large reserve per continent" or world region should be established (p. 64). The strategic conception of large national parks as the most prestigious testimony of conservation lasted until at least the early 1970s. In its *UN List of National Parks and Equivalent Reserves* of 1971, IUCN stated that "a priori, it seems logical to apply a 'size' criterion to the selection of National Parks and equivalent reserves" (Harroy and IUCN 1971:29).

Such arguments were increasingly expressed in scientific terms. In the late 1960s and early 1970s, with the participation of many IUCN conservationists in large-scale international science projects, ecosystem ecology found its way to conservation theory and practices. Ecosystem ecology had first become known in the 1930s and 1940s through the work of the British botanist Arthur Tansley, who defined the ecosystem as "a particular category [of] physical systems," containing both organisms and inorganic components in a "relatively stable equilibrium" and existing in "various kinds and sizes" (Tansley 1935:306, 299). The ecosystem soon became seen as a useful unit to examine and describe natural processes. Within conservation discourse, arguments favoring large islands of preserved nature cut off from human influences were reinforced by the emerging ecosystem paradigm. Already at the IUCN General Assembly in Delhi 1969, conservationists stressed that the term national park should refer to a "relatively large area" that was able to protect the entirety or large parts of an ecosystem (IUCN 1969; Boardman 1981:83). At the Second World Congress on National Parks convened at Yellowstone National Park in 1972, IUCN's senior ecologist Raymond Dasmann explained the idea: "For most species, conservation is likely to be achieved only through protection and management of ecosystems to which they belong" (Dasmann in IUCN, United States Park Service, and Elliott 1972:389). In the following years, new research on extensive ecosystems like the humid tropics, marine systems, and wetlands helped strengthen the case for large reserves.

Around the same time, and despite criticism by several European country representatives, IUCN doubled its size criterion for National Parks to 1,000 ha, with the exception of actual islands of smaller size (IUCN and ICNP 1973:5). While officially no numbers were provided, in 1975, at IUCN's 13th General Assembly in Kinshasa, the Soviet IUCN expert A. G. Bannikov argued for reserves of 5,000–10,000 ha if adjacent to forests or water reserves and 100,000 ha of isolated areas in temperate zones. In extreme and arctic conditions, reserves needed to be as large as up to 500,000 ha, he claimed (IUCN 1975:159). Similarly, Kenton Miller, chairman of IUCN's Commission on National Parks and Protected Areas, roughly estimated that "to preserve the natural features of ecosystems" in scientific reserves '5,000 to several 100,000 ha' were needed, while the size of a wildlife sanctuary depended upon the habitat requirements of the species of interest" (Miller 1979:11–12). In short, the persistent emphasis on preservation of pristine

nature and whole ecosystems demanded large and unbroken sanctuaries, free from human disturbance. Diamond's model for reserve design fitted perfectly with this long-standing ideal.

## Nature Islands in a Sea of Human Development

To carve out the environmentality of Diamond's model for reserve design, it is illustrative to look at a concrete site where the model and the ideas underlying it were implemented. This was the case in Chitwan National Park in Nepal. Until the early 1950s, Chitwan Valley embodied the kind of nature that conservation experts throughout the twentieth century desired to protect. Located at the foothills of the Himalayas, the region contained vast areas of unspoiled virgin forests where ecological processes and natural selection unfolded seemingly undisturbed. With the exception of a few indigenous Tharu tribes, who had lived in the valley for many decades, and occasional expeditions of Rana rulers, who protected Chitwan as their private hunting ground, humans had cautiously avoided the place. As a consequence, wildlife such as Asian elephant, Bengal tiger, sloth bear, and a stunning number of 1000 greater one-horned rhinoceroses flourished.

However, in the 1950s, after the collapse of the Rana regime, Nepal's new semi-democratic government decided to open Chitwan Valley up for agricultural development and land settlement. In less than a decade, more than half of the valley's virgin forests were sawed down while thousands of poor farmers from the hills around Kathmandu poured into the area. With the forests gone and human activities expanding, the once numerous wildlife populations virtually disappeared until only a few hundred rhinos remained left in the wild (Gee 1959). It was the disappearance of large charismatic mammals in particular that triggered international concern. In the 1960s and 1970s, IUCN experts visited the place and managed to convince the Nepali government to establish a national park to save the greater one-horned rhinoceros (Gee 1963).

The first design for Chitwan National Park was modeled on dominant ideas about preserving large undisturbed natural areas against human disturbance (Bolton 1975). Indeed, closely resembling Diamond's preferred design, Chitwan National Park was established as a single, large conservation island. The boundary itself was heavily protected with fences, barbed wire, outposts, and 1,000 army guards (Nepal and Weber 1995:91–110). For conservationists, these measures proved to be a huge success. The rhino population recovered and even reached numbers not seen for over a century. Thus, in 1982, an ecologist at the Nepalese government called Chitwan "a classic example of a success story where government determination backed by local and international expertise changed a depleted area into one of the most outstanding national parks in the world" (Mishra 1984:197).

From a humanistic perspective, however, Chitwan was a downright disaster. To realize the ideal of undisturbed wilderness, 22,000 local people were

relocated outside the park's boundaries (Bolton 1975:5). And, while wildlife flourished inside the park's boundaries, the relocated population was not allowed to enter the park in search for basic needs including firewood, fodder, thatch grass, and timber. When the adjacent lands became depleted because of heavy agricultural use and overgrazing, however, local people naturally turned their eyes back toward Chitwan. The national park had literally become an isolated island surrounded by a rising sea of human development (Mishra 1984:251). This, in turn, also affected the rhino population in two ways. First, Chitwan's shape as a SL reserve, closed-off from its surroundings, helped to keep local population at bay, but it also restricted the rhinos' movement. This made the population vulnerable because in cases of threats like fire and disease, they could not escape or migrate. Second, although Chitwan National Park had been expanded from 54,400–93,200 ha in the course of the 1970s, the area's size, conservation experts started to realize, was still not large enough to accommodate a viable rhino population (Laurie 1982:338; Dinerstein and Price 1991:411). Unless the park was further extended, or connected to other nature reserves, the greater one-horned rhinoceros would fall victim to inbreeding.

A look at the secondary literature shows that Chitwan's conceptualization was far from exceptional. In many early national parks, space was constructed as undisturbed wilderness and put under close surveillance in order to keep out relocated human populations (Gissibl in Gissibl, Höhler and Kupper 2012). And, in many of these places, regimes of strict protection resulted in people-park conflicts over resource use and insulated wildlife populations. Serengeti National Park in Tanzania, for instance, provides a case in point. The Serengeti plains and their rich fauna and migrating herds have come to embody the ideals of pristine wilderness and wildlife conservation (e.g., see Neumann 1998; Shetler 2007). Early on, colonial authorities and later international organizations zealously tried to protect this site from human disturbance. In 1929, parts of southern and eastern Serengeti were first put under protection as a game reserve encompassing 2,286 ha against uncontrolled killing by white big game hunters. In the 1940s, the colonial government increasingly also tried to keep out the Maasai population and their cattle, and the game reserve attained Protected Area Status. In 1951, finally, southern Serengeti and Ngorongoro were established as Tanzania's first National Park (Adams and McShane 1992:51; Sinclair and Arcese 1995:4–5).

Despite this perceived success for conservation, also in Serengeti new problems occurred soon after. Pressures on the park's boundaries emerged when in the early 1950s the colonial government campaigned against the tsetse fly, a carrier of the livestock disease African Animal Trypanosomosis. As a consequence, the colonial farmers' cattle prospered. The Maasai farmers living in the area also benefited from the eradication of the disease and soon demanded more land for their growing herds. Soon after, one of IUCN's member organizations, the Fauna Preservation Society (FPS),

became involved and demanded a change of the Park Ordinance of 1955. The Ordinance still allowed Maasai to stay in the protected areas if they remained in a preagricultural state. Originally, the Northern conservationists had imagined the Maasai as living largely in harmony with nature (e.g., Neumann 1998:136). In practice, however, farming and livestock raising was increasingly pursued by the Maasai within the boundaries of the park (Zerner 2012:125). Rather than complying with the demands made by the conservationists to change the Ordinance and to relocate the Maasai from the park, the Tanganyika legislature decided that since the Maasai did not move, the park boundaries had to be changed, a measure that would reduce the original park size by half. Soon after, an international conservation controversy was underway: In 1956, the North American IUCN ecologist Lee Talbot wrote to Marguerite Caram, head of the IUCN Secretariat, that "the Serengeti Park is not an internal problem, it has taken on the dimensions of an international one. I feel strongly that the Union will be failing to fulfil its purpose if it does nothing in this case."[1]

In the years following this first conflict with local communities, international efforts to secure the protection of large parts of the Serengeti continued. With the independence of Tanganyika in 1961, the Serengeti attained new attention and funding from international NGOs like IUCN and its member organizations, in particular the Frankfurt Zoological Society headed by the famous German conservationist Bernhard Grzimek. With this support, the park was expanded to include the Lamai Wedge between Mara River and the Kenya border and, in 1967, the area was further enlarged with a small area north of the Grumeti River. The Masaai had to give up all their rights in the actual Seregenti National Park; while in the bordering Ngorongoro Conservation Area, their possibilities to perform pastoralism were increasingly restricted. Slowly, the island model was enacted. Serengeti became a typical instance of what present-day scholars describe as "fortress conservation," in which "wilderness" and human activities are clearly separated (Igoe 2004:70–72; Gardner 2016:37).

The design of Chitwan National Park resembled that of Serengeti and other protected areas in Asia and Africa. It was a type of design that, in 1980, would be epitomized in Diamond's model for single, large islands. On the ground, however, this model, which fitted a long-established ideal, resulted in a double problem. The strict separation of space for nature and space for human development, on the one hand, led to struggles between local people and park authorities over land and natural resources. On the other hand, wildlife populations – especially the charismatic megafauna that conservation experts were so keen to protect – were vulnerable to threats and unable to exchange genes. Consequently, international conservation organizations realized that the insular reserve model, still written into the *World Conservation Strategy* of 1980, was heavily flawed. A new way of designing nature reserves was needed now that Diamond's model had lost its sparkle.

## Nature Reserves as Bioregions

In the *World Conservation Strategy*, experts had adopted Diamond's spatial model for the design of nature reserves because it scientifically legitimized the common practice of establishing large and undisturbed reserves. In the course of the 1980s, however, it became clear that existing national parks that were designed according to this dominant model had given rise to people-park conflicts and were unable to adequately preserve threatened species in the long run. In the following years, experts at IUCN embraced a new *bioregional* model for reserve design, which promised to solve this double problem. Kenton R. Miller, former Chairman of IUCN's Commission on National Parks and Director of the World Resources Institute's Biological Resources Program, introduced bioregionalism, as a concept, in the 1990s. Miller defined bioregionalism as an "approach that seeks to maintain biological diversity across entire landscape regions while meeting people's needs" (Miller 1996; Miller and Hamilton 1999b:3). It did so, according to Miller, by combining four "key elements": A series of strictly protected ecosystems (the islands in Diamond's model), protective buffer zones that surround these ecosystems, corridors between them to encourage wildlife movement and genetic exchange, and programs to promote collaboration with local populations. Protected ecosystems and corridors were meant to protect wildlife in the long run, while buffer zones and collaboration programs aimed to resolve people-park conflicts. The latter in particular was stressed by Miller when he presented the new model to policy-makers: "The term bioregion connotes the inclusion in the early steps of planning of all interested local residents, those who use or depend upon the area's resources and those who have other interests in the area and its people" (Miller 1996:6).

Like Diamond's model in the *World Conservation Strategy*, IUCN experts introduced bioregionalism with a visual representation (Figure 10.2). Both visually and theoretically, the new model differed substantially from its predecessor. Compared to Diamond's checklist, the visual representation of the new model is much less abstract and contains more detail, including visualizations of the four key elements. Diamond's islands are still visible as "core protected areas," but these are now surrounded by "buffer zones", which are connected through "corridors" and embedded in the adjacent landscape ("matrix"). Circles, lines, colors, and drawings give the model a certain visual appeal. Rather than the bureaucratic and rational checklist of Diamond, the experts who designed the visual representation of the new bioregional model deliberately aimed to "capture the imagination of communities and governments" (Miller and Hamilton 1999a:48). Instead of Diamond's list of different options, bioregionalism favors only one design: A landscape consisting of a conglomeration of SS core areas connected through corridors. In the new model, connectivity is more important than the size of individual nature reserves. In addition, bioregionalism tried to integrate different land uses on a landscape scale. Drawings of groups of

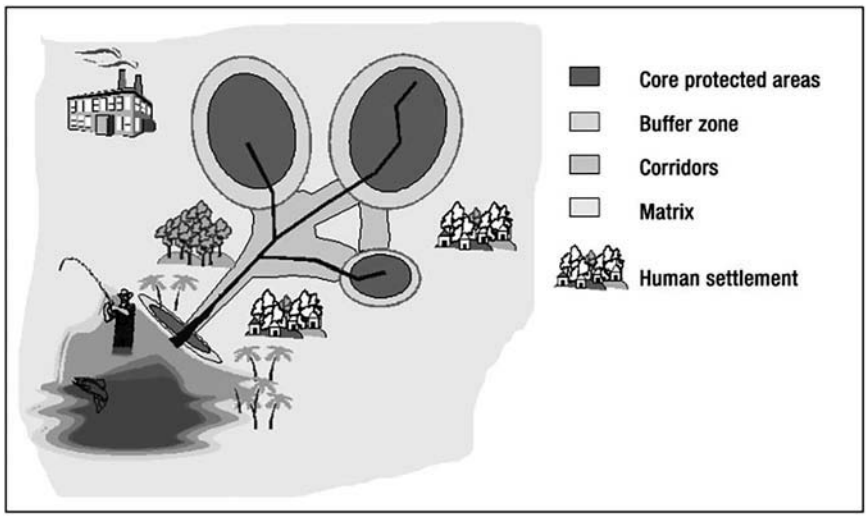


*Figure 10.2* The bioregional approach to protected areas.
Source: Miller and Hamilton 1999a.

trees, a fisherman, buildings on hills surrounded by trees, and a factory with smoking chimneys all symbolize different human land uses (e.g., forestry, recreation, human settlement, and industrial production, respectively), while the dots and lines representing core areas, buffer zones, and corridors are sites for nature protection – the focus of Diamond's model. Interestingly, with bioregionalism the full landscape matrix is presented as a potential space for nature conservation. Human settlements and industrial areas are literally put on the map as sites for conservation action.

Just like the idea of the island reserves promoted in the *World Conservation Strategy*, the bioregional model can be seen as the culmination of a longer tradition. The scientific principles behind bioregionalism were established in the 1980s in the wake of an academic controversy between American conservation biologists about the possibility of scientifically determining the right size of reserves (Kingsland 2002:10). This controversy – later known as the SLOSS (SL or SS) debate – proved crucial in the shift from the island to the bioregional model. In the SLOSS debate, two opposing camps of biologists proposed different solutions for the ideal design of nature reserves. One group that included Jared Diamond argued that SL protected areas would best serve conservation purposes, while the other firmly criticized these views by stating that SS reserves of the same total size should be preferred. IUCN experts followed these debates and were keen to translate state-of-the-art scientific insights into practical guidelines for conservation practitioners (e.g., see Carleton Ray in IUCN 1975:89). In 1980, they showed their adherence to SL reserves by taking up Diamond's model in the *World*

*Conservation Strategy*. Right after the document was published, however, Diamond's ideas were challenged.

The biggest problem with SL or SS reserves, conservation biologists started to realize, was insulation. All fenced protected areas, whatever their size, were vulnerable to disturbances and would ultimately facilitate extinction. Without a way to escape to other areas, after all, one single pandemic or forest fire could wipe out an entire population inside a fenced island reserve (Frankel and Soulé 1981:89). Isolated reserves, moreover, also harmed genetic viability. For a population to survive, it was essential that it could exchange genes with other populations (Soulé and Simberloff 1986). It became clear that, apart from size, the location of nature reserves in relation to each other mattered, as well as the connectivity among these reserves. Diamond's model, in other words, did not have much practical value to conservation in the long run. Thus, in 1986, Michael E. Soulé and Daniel Simberloff, two former opponents in the controversy, declared that "the SLOSS (SL or SS) debate is no longer an issue in the discussion about the optimal size of nature reserves" (p. 19). Although they admitted that providing alternative scientific rules for establishing nature reserves was "extremely complex," Soulé and Simberloff discussed the value of buffer zones, corridors, and "a consortium of reserves" (p. 32). What we have here then is bioregionalism *avant la lettre*.

The buffer zones concept was developed by UNESCO in the 1970s (UNESCO 1974; Batisse 1982; Di Castri and Robertson 1982) and had already proved its value in practice. Corridors, however, were a more recent – and at the time of Soulé's and Simberloff's influential article also more controversial – invention. But by the 1990s, after practical experiments, they were generally accepted as a useful conservation tool (Newmark 1993). The idea underlying corridors was a simple one: By linking existing isolated island reserves, species could disperse juveniles, exchange genes, temporally escape, or migrate. Corridors could either be linear or consist of stepping-stones – a series of protected sites where species could find shelter and food during displacement. Faced with problems on the ground, experts at IUCN took the new scientific findings to heart. At the Fourth World Congress on National Parks and Protected Areas, for instance, Jeffrey McNeely, IUCN's Chief Conservation Officer, argued that Diamond's "'island mentality' is fatal in the long run" (McNeely 1993:8). In a similar vein, Miller (1996:13) stated that protected wildlands needed to be "linked by corridors – ideally, swaths of natural or restored wildland, but in practice often crop, pasture, and harvested forest lands – so animals can move freely and communities can respond to global change."

In addition to the scientific paradigm shift that fed into the conservation guidelines, IUCN's sudden move away from the island mentality was also motivated by a rather crude form of risk control and crisis management. In the 1990s, there were indications that the theory underlying the island model could not provide solutions for several practical problems. IUCN's *Red*

*Lists of Threatened Species* indicated that biodiversity was declining rapidly (IUCN 1990). What is more, many remaining populations of critically endangered large mammal species resided in single, isolated national parks, like indeed, the Indian rhinoceros (*rhinoceros unicornis*) in Chitwan. To prevent extinction of these isolated populations, experts at IUCN deemed it necessary to quickly connect existing nature reserves through corridors. At the same time, at the human level there were increasing tensions between park managers and the local population, and growing international calls for sustainable development. Together, these issues forced IUCN to rethink the relation between parks and people. In response, experts introduced the new bioregional model that tried to appropriate entire landscape regions rather than SL reserves as space for conservation action.

## Spatial Ramifications of Bioregionalism

In order to analyze how the new model was applied on the ground, we will once again turn to Nepal. Experts at IUCN chose Chitwan National Park as one of the crucial test cases to try out the new bioregional approach and solve the double problem of encroachment by local people and insulation of wildlife (Nepal and Weber 1995:863; Bhusal 2014:36). As a result, in the 1990s and 2000s, Chitwan National Park experienced a large-scale transition that fundamentally changed its design. By closely following the bioregional model, experts turned the conservation island of the 1980s into a conservation landscape with buffer zones and corridors. In the early 1990s, for instance, a buffer zone that covered an area of 75,000 ha was added to Chitwan National Park. As a result, 260,000 "very poor" farmers and indigenous Tharu people, who had been evicted in the 1970s, suddenly lived within Chitwan's boundaries (The Government of Nepal 2015:62). To control local people's use of natural resources, experts divided the buffer zone into three different subzones. A "conservation zone" functioned as "extended wildlife habitat," a "sustainable use zone" – at least on paper – combined wildlife protection with "community management of natural resources," and an "intensive use zone" allowed "environmentally friendly development activities" (pp. 66–67).

After the people-park conflicts of the 1980s, one would expect that people living within these zones received a considerable degree of autonomy. In practice, however, despite the new rhetoric of community development and a fundamental spatial redesign, old biases toward wildlife and mutual distrust between experts and local populations led to a situation in which park authorities managed all subzones as extended wildlife habitat. In finding a balance between rigorous enforcement for the sake of wildlife preservation and unrestricted resource use by local people, conservationists gave in to "mistrust and fear that full autonomy for local people may lead to overexploitation of resources" (Paudel, Budhathoki, and Sharma 2007:47). Thus, within the different zones people were subjected to strict regulations

enforced through a complex hierarchical administrative structure consisting of a Buffer Zone Management Committee (BZMC) that watched over 21 Buffer Zone Use Committees (BZUC) and 1779 User Groups (UG). With these different zones and associated complex administrative structure, park authorities were able to organize and control activities of local communities. An important aspect of this new surveillance regime was the social division of control labor. Chitwan, as a conservation island, had been defended by the army. In the new buffer zones, however, soldiers collaborated with local volunteers in making sure that everyone adhered to park rules. Barandabhar forest, for example, which is one of Chitwan's buffer zone community forests, is protected by three army security posts and two national park security posts. In addition, an "Integrated Rhino Conservation Committee" consisting of conservationists, hotel owners, and representatives of the BZUC patrol the area "from morning to evening" and report daily to the park authorities (The Government of Nepal 2015:64).

Next to the establishment of buffer zones in response to people-park conflicts, the insulation of wildlife in Nepal was countered with corridors. In 1999, international experts introduced the Terai Arc Landscape, an ambitious plan to "restore and maintain wildlife corridors that link 11 protected areas" in Nepal (USAID and WWF 2002). As part of this scheme, Chitwan National Park became part of an enormous conglomeration of protected areas, restoration sites, and corridors with a total size of 495,000 ha. To improve genetic diversity of rhinos and tigers, for instance, the Barandabhar forest between Chitwan and the Mahabharat foothills was placed under the park's authority and redeveloped as "migration corridor" (UNDP 2007:2; Kandel 2012). Via this linkage, wildlife could leave Chitwan and move throughout the entire Terai Arc Landscape all the way to Bardia National Park and Shuklaphanta Wildlife Reserve (Aryal et al. 2012:45).

The Terai Arc Landscape added yet another complex management structure to the existing management zones. In order to control poaching, experts established advanced "intelligence networks" that further divided control labor (Martin 1996:10). Thus, one Anti-Poaching Unit equipped with "vehicles, radios, and tents" was set up in Chitwan National Park under the authority of the chief warden (p. 17). The buffer zone and forest corridor, in turn, were allotted their own Anti-Poaching Units guided by the National Park and Buffer Zone Development Council and the District Forest Officer, respectively. The latter had 54 armed guards, 60 forest guards, 25 rangers, and four assistant forest officers at his disposal (p. 16). In addition, two Community-Based Anti-Poaching Groups and "informers" in villages received salary and reward money as economic incentive to report poaching (UNDP 2007).

While bioregionalism did result in important changes to Chitwan National Park, this was less the case in other (bigger) reserves. In Serengeti, for instance, rather little changed. Conservation experts in Tanzania did adopt the new rhetoric of bioregionalism and people-centered conservation but

without adding additional buffer zones or corridors (Parkipuny 1989; Miller 1996:38). The park's size of 1,476,300 ha, after all, was already large enough to accommodate migrating herds and additional corridors were not necessary. With wildlife sufficiently protected and granted enough space, the promises to solve people-park conflicts by involving local communities in the conservation of buffer zones did not materialize (Boshe 1989). Both Serengeti National Park and Ngorongoro Conservation Area, for example, remained strictly protected, allowing no settlements or hunting (Leader-Williams et al. 1996:166; Shelter 2007:222). Ironically, then, although implemented to different degrees, in both the Serengeti and Chitwan, the conservationists' rhetoric of opening parks up to people that went together with their new bioregional model did little to solve people-park conflicts. In Chitwan, bioregionalism even resulted in stricter control, refined management, and further appropriation of space for wildlife controlled by Western conservationists. The area's size and design changed dramatically, but communities gained less instead of more autonomy. In practice, buffer zones put human activities under close surveillance and helped conservationists to govern, manage, and control natural resource use.

## Conclusion

Nature reserves and national parks continue to be the most important visual and material testimony of the global conservation movement. Lists of national parks present an important flagship for conservation achievements. Moreover, parks are important mechanisms for the protection of particular types of nature in particular localities. It is little surprising then that the quest for comparability and a golden standard in park design remains an important conservation activity up to the present day. At the same time, however, the use of global schemes to protect local nature has always been a topic of scientific and political debate. Ideas behind science-based nature protection have changed several times and so did the arguments of scientists for ideal spaces for conservation. In this chapter, looking at national park designs through the lens of Luke's concept of environmentality has helped us distinguish between the conservationists' use of scientific theory, governance ideals, and the consequences for conservation practices on the ground.

In particular, this chapter has focused on two important and iconic models for nature reserve design: Diamond's island model adapted in the *World Conservation Strategy* and the bioregional model of the 1990s, an integration of buffer zones and corridors. Highlighting the differences between the two designs when it comes to scientific theory and their ideals regarding human-nature interaction, conservation experts have described the change from the first to the second model as a fundamental shift in conservation paradigms. The island model was linked to population and later ecosystem research that stressed the need to protect wild habitat in its entirety. Moreover, the island model epitomized an approach in which nature conservation authorities had

put the creation and maintenance of nature reserves above the traditional rights and customs of local populations. Yet, the installment of large reserves was not an option in all topographical regions. On top of this, over time the island mentality had created severe conflicts between local populations and the international conservation community. In the 1980s, then, alternative conservation approaches suggested that rather than isolating protected areas, integrating them into the surrounding landscapes might in fact be crucial for protecting viable populations and species communities. At the same time, globally organized conservation initiatives began to consider the involvement of local communities. As a consequence, the second, bioregional model for park design in fact made a double promise. First of all, it aimed at preserving genetic and biological diversity over SS-connected reserves, spreading the risk of extinction through epidemics or other catastrophes. A second articulated goal was the inclusion of the local needs of indigenous people through the addition of buffer zones for flexible use and integration of traditional land use practices in between the different core reserves.

Despite this paradigm shift in discourse on ideal park design, looking at concrete places, we have demonstrated that the *environmentality* or governance practices tied to reserve management on the ground did not change to the same degree. Our analytic comparison of Chitwan National Park in Nepal with the well-known case of Serengeti National Park in Tanzania has shown that even after conservationists had distanced themselves from the restrictive and domineering island approach, regulations continued to strictly manage and control human access to park areas. This might be less surprising in the case of Serengeti National Park, an iconic example of an early large reserve, which retains its arduously attained insular structure and size until the present day. Significant, however, is our finding that similar forms of governance persisted even where the new bioregional approach was implemented and the island approach practically abandoned. The case of Chitwan exemplifies that the political legacy of technocratic reserve management was not overcome even in places where spatial parameters were changed on the ground.

As we have shown, the conservation community used Chitwan National Park to test the new reserve model of bioregionalism in practice. Consequently, the spatial design of the park was distinctively altered. The redesigned park was a conservation landscape spanning the whole Terai Arc. The management of the new park in Chitwan explicitly challenged the island metaphor and lobbied for a stronger integration of local communities, allowing them to pursue traditional forms of land use in buffer zones between conservation areas and in corridors. However, especially the humanistic potential of bioregionalism, lauded in theory, remained latent in practice. Instead of opening up new ways of interaction between local communities and conservation experts, bioregionalism in Chitwan resulted in a complicated management regime and stricter structures of access control, which involved often heavily armed guards and even larger parts of the area than had earlier been the case.

Focusing on Chitwan National Park, an example seldom attended to in the secondary literature on iconic conservation areas, this chapter has revealed an important mismatch between conservation rhetoric and governance practice. Next to its historical relevance, this mismatch remains in fact topical in the context of present-day conservation work. At the time of writing, bioregionalism still constitutes a flagship approach in international conservation projects by organizations such as UNESCO or IUCN. Very often, bioregionalism is portrayed as progressive, radically different from exclusive island protectionism, and as one of the solutions to integrate local communities in conservation work (e.g., Bishop, IUCN and UNEP 2004; Brunckhorst 2013). In this regard, our chapter makes a case for a critical approach to models for park designs, and the need to look beyond changes in discourse and intention. In particular, our analysis has challenged the notion that a change in spatial conceptualizations alone may be enough to radically alter and improve the often exclusive governance practices of existing international nature conservation regimes, which have been established over long periods of time.

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## Note

1 Muséum d'Histoire Naturelle, Roger Heim Papers, Box 47, February 18, 1956.

## References

Adams, A.B., IUCN, and UNESCO. 1964. *First World Conference on National Parks: Proceedings of a Conference: Seattle, Washington, June 30–July 7, 1962*. Washington, DC: US National Park Service.

Adams, Jonathan S. and Thomas O. McShane. 1992. *The Myth of Wild Africa: Conservation without Illusion*. Richmond: University of California Press.

Aryal, Achyut, Dianne Brunton, T.K. Shrestha, R.K. Koirala, Jennie Lord, Y.B. Thapa, B. Adhikari, W. Ji, and D. Raubenheimer. 2012. "Biological Diversity and Management Regimes of the Northern Barandabhar Forest Corridor: An Essential Habitat for Ecological Connectivity in Nepal." *Tropical Conservation Sciences* 5(1): 38–49.

Batisse, Michel. 1982. "The Biosphere Reserve: A Tool for Environmental Conservation and Management." *Environmental Conservation* 9(2): 101–11.

Bhusal, Narayan Prasad. 2014. "Buffer Zone Management System in Protected Areas of Nepal." *The Third Pole: Journal of Geography Education* 11: 34–44.

Bishop, Kevin, IUCN, and UNEP. 2004. *Speaking a Common Language: The Uses and Performance of IUCN System of Management Categories for Protected Areas*. Cardiff: Cardiff University Press.

Boardman, Robert. 1981. *International Organization and the Conservation of Nature*. Bloomington: Indiana University Press.

Bolton, Melvin. 1975. *Royal Chitwan National Park: Management Plan 1975–1979*. Nepal: UNDP/FAO.

Boshe, J.J. 1989. "Towards Managing Ngorongoro Conservation Area's Conflicting Interests." *Kakakuona: Magazine of the Tanzania Wildlife Protection Fund* 3: 6–7.

Brunckhorst, David, J. 2013. *Bioregional Planning: Resource Management Beyond the New Millennium*. London: Routledge.

Di Castri, Francesco and J. Robertson. 1982. "The Biosphere Reserve Concept: 10 Years After." *Parks* 6(4):1–6.

Diamond, Jared M. 1975. "The Island Dilemma: Lessons of Modern Biogeographic Studies for the Design of Natural Reserves." *Biological Conservation* 7(2): 129–46.

Dinerstein, Eric and Lori Price. 1991. "Demography and Habitat Use by Greater One-Horned Rhinoceros in Nepal." *The Journal of Wildlife Management* 55(3): 401–11.

Frankel, Otto H. and Michael E. Soulé. 1981. *Conservation and Evolution*. Cambridge: Cambridge University Press.

Gardner, Benjamin. 2016. *Selling the Serengeti: The Cultural Politics of Safari Tourism*. Athens, Georgia: The University of Georgia Press.

Gee, Edward Pritchard. 1959. "Report on a Survey of the Rhinoceros Area of Nepal." *Oryx* 5: 59–85.

Gee, Edward Pritchard. 1963. "Report on a Brief Survey of the Wildlife Resources of Nepal, Including the Rhinoceros." *Oryx* 7: 67–76.

Gissibl, Bernhard, Sabine Höhler, and Patrick Kupper. 2012. *Civilizing Nature: National Parks in Global Historical Perspective*. New York: Berghahn Books.

Harroy, Jean-Paul and IUCN. 1971. *United Nations List of National Parks and Equivalent Reserves*. Brussels: Publishers Hayez.

Holdgate, Martin W. 1999. *The Green Web: A Union for World Conservation*. Gland: IUCN.

Igoe, Jim. 2004. *Conservation and Globalization: A Study of National Parks from East Africa to South Dakota*. Belmont: Celgage Learning.

IUCN. 1962. *List of National Parks and Equivalent Reserves*. Morges: IUCN.

IUCN. 1969. *Tenth General Assembly: Vigyan Bhavan, New Delhi, 24 November–1 December, 1969*. Morges: IUCN.

IUCN. 1975. *Thirteenth Technical Meeting, Kinshasa, Zaire, 8–17 September 1975: Papers*. Morges: IUCN.

IUCN. 1980. *World Conservation Strategy*. Gland: IUCN.

IUCN. 1990. *IUCN Read List of Threatened Animals*. Cambridge: IUCN Conservation Monitoring Center.

IUCN and ICNP. 1973. *United Nations List of National Parks and Equivalent Reserves*. Morges: IUCN.

IUCN, United States Park Service, and Hugh F. Elliott. 1972. *Second World Conference on National Parks*. Morges: Published for National Parks Centennial Commission by IUCN.

Kandel, Ram Chandra. 2012. "Wildlife Use of Bharandabhar Forest Corridor: Between Chitwan National Park and Mahabharat Foothills, Central Tarai, Nepal." *Journal of Ecology and the Natural Environment* 4(5): 119–25.

Kingsland, Sharon E. 2002. "Designing Nature Reserves: Adapting Ecology to Real-World Problems." *Endeavour* 26(1): 9–14.

Laurie, Andrew. 1982. "Behavioural Ecology of the Greater One-Horned Rhinoceros (Rhinoceros Unicornis)." *Journal of Zoology* 196(3): 307–41.

Leader-Williams, N., J. A. Kayera, G. L. Overton, and IUCN. 1996. *Community-Based Conservation in Tanzania: Proceedings of a Workshop Held in February 1994*. Gland: IUCN.

Luke, Timothy W. 1995. "On Environmentality: Geo-Power and Eco-Knowledge in the Discourses of Contemporary Environmentalism." *Cultural Critique* (31): 57–81.

Luke, Timothy W. 2001. "Environmentality," pp. 96–109 in *The Oxford Handbook of Climate Change and Society*, edited by John S. Dryzek, Richard B. Norgaard, and David Schlosberg. London: Oxford University Press.

Martin, Esmond B. 1996. "The Importance of Park Budgets, Intelligence Networks and Competent Management for Successful Conservation of the Greater One-Horned Rhinoceros." *Pachyderm* 22: 10–17.

McNeely, Jeffrey A. 1993. *Parks for Life: Report of the IVth World Congress on National Parks and Protected Areas, 10–21 February 1992*. Gland: IUCN and WWF.

Miller, Kenton. 1979. *Planning National Parks for Ecodevelopment: Methods and Cases from Latin America*. Madrid: Fundación para la Ecologia y para la Protección del Medio Ambiente.

Miller, Kenton. 1996. *Balancing the Scales: Guidelines for Increasing Biodiversity's Chances through Bioregional Management*. Washington, DC: World Resources Institute.

Miller, Kenton and Lawrence Hamilton. 1999a. "Future Steps." *Parks* 9(3): 46–49.

Miller, Kenton and Lawrence Hamilton. 1999b. "Editorial: Bioregional Approach to Protected Areas." *Parks* 9(3): 1–6.

Mishra, Hemanta. 1984. "A Delicate Balance: Tigers, Rhinoceros, Tourists and Park Management Vs. The Needs of the Local People in Royal Chitwan National Park, Nepal," pp. 197–205 in *National Parks, Conservation and Development: The Role of Protected Areas in Sustaining Society*, edited by Jeffrey A. McNeely and Kenton Miller. Washington, DC: Smithsonian Institution Press.

Nepal, Sanjay and Karl Weber. 1995. "Resolving the Park-People Conflict: The Royal Chitwan National Park, Nepal," pp. 91–110 in *Managing Protected Areas under Conditions of Conflict*, edited by Sanjay Nepal and Karl Weber. Bangkok: Asian Institute of Technology.

Neumann, Roderick P. 1998. *Imposing Wilderness: Struggles Over Livelihood and Nature Preservation in Africa.* Berkeley: University of California Press.

Newmark, William D. 1993. "The role and design of wildlife corridors with examples from Tanzania." *Ambio* 22(8): 500–4.

Pan American Union. 1940. *Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere*. Washington, DC: Pan American Union.

Parkipuny, Moringe. 1989. "Pastoralism, Conservation and Development in the Greater Serengeti Region: Occasional Paper No. 1." Paper presented at the Ngorongoro Conservation and Development Project, Loliondo, Tanzania.

Paudel, Naya S., Prabhu Budhathoki, and Uday R. Sharma. 2007. "Buffer Zones: New Frontiers for Participatory Conservation." *Journal of Forest and Livelihood* 6(2): 44–53.

Shetler, Jan B. 2007. Imagining Seregeti: *A History of Landscape Memory in Tanzania from Earliest Times to the Present*. Athens: Ohio University Press.

Sinclair, A.R.E. and P. Arcese. 1995. *Serengeti II: Dynamics, Management, and Conservation of an Ecosystem*. Chicago: University of Chicago Press.

Soulé, Michael E. and Daniel Simberloff. 1986. "What Do Genetics and Ecology Tell Us About the Design of Nature Reserves?" *Biological Conservation* 35(1): 19–40.

Tansley, Arthur G. 1935. "The Use and Abuse of Vegetational Concepts and Terms." *Ecology* 16(3): 284–307.

The Government of Nepal. 2015. *Chitwan National Park and Its Buffer Zone Management Plan 2013–2017*. Kasara: Chitwan National Park Office.

UNDP. 2007. "Landscape-Scale Conservation of the Endangered Tiger and Rhino Populations in and around Chitwan National Park." *Tiger-Rhino Conservation Project. Report of the Final Evaluation Mission* August 2007.

UNESCO. 1974. *Task Force On: Criteria and Guidelines for the Choice and Establishment of Biosphere Reserves: Organized Jointly by UNESCO and UNEP: Final Report*. Paris: UNESCO.

USAID and WWF. 2002. "Eastern Himalayas Ecoregion: Terai Arc Landscape." *Semi-Annual Report* 10/01/02–3/31/03.

Zerner, Charles. 2012. *People, Plants, and Justice: The Politics of Nature Conservation*. New York: Columbia University Press.