A World Heritage Species Case Study: Bwindi Gorillas

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I. Introduction

The Bwindi gorilla, inhabiting the Bwindi Impenetrable National Park of Uganda and wandering into the Sarambwe Special Reserve in the Democratic Republic of Congo (DRC), numbers just 300 individuals. With a dense human population using the area in and around the habitat of the Bwindi gorilla, habitat loss constitutes the primary threat to the Bwindi gorilla**.** The IUCN has declared it critically endangered.

Several research, local development, and tourist-related projects are already underway to improve the condition of the Bwindi gorilla and the people who reside in the area. Some of these appear to be successfully reversing the tide of resentment caused by the Uganda government when it established the closed the Bwindi Impenetrable National Park and denied access to it by local people who had previously used the area for gathering food and material for baskets and shelter.

Nonetheless, Bwindi gorillas could benefit from increased international collaboration among researchers and management, enforcement, tourism and other officials from Uganda and DRC. That Bwindi gorillas remain critically endangered and subject to loss of habitat suggests that existing efforts along may not be sufficient. The designation of Bwindi gorillas as a World Heritage Species, which can include subspecies and geographically separate populations, may provide the impetus necessary to secure a more stable future for Bwindi gorillas. World Heritage Species status would generate transboundary collaboration between Uganda and the DRC, may encourage increased political will to enforce existing laws, and may motivate the international donor community to focus attention on these unique creatures that share a close evolutionary link to humans.

II. Taxonomy

A distinct population of mountain gorillas is found in the Bwindi-Impenetrable National Park (BINP) in southwest Uganda. BINP borders the Democratic Republic of Congo (DRC) to the west. Bwindi gorillas are currently classified as *Gorilla beringei beringei* although some literature still refers to them as *Gorilla gorilla beringei*. Overall, few studies have been conducted on the diet, ecology, and demography of the Bwindi gorillas.[1]

Bwindi mountain gorillas may form a third subspecies of the eastern gorilla, *Gorilla beringei*, although the taxonomic status of the population is unclear.[2] To date, there is no consensus on the classification of Bwindi gorillas. Morphological and ecological differences between the gorillas of BINP and the Virunga volcanoes cause some researchers to insist that Bwindi gorillas should not be classified as mountain gorillas.[3] For example, Bwindi gorillas consume more fruit than Virunga gorillas.[4] Bwindi gorillas tend to live at lower elevations and in warmer temperatures.[5] Bwindi gorillas also have less shaggy coats and a slightly smaller build.[6] Other researchers do not think the differences warrant an additional subspecies classification.[7] DNA analysis indicates that the two groups of mountain gorillas are indistinguishable,[8] although genetic similarity does not solely determine species classification. Even if the Bwindi gorillas do not constitute a distinct subspecies, they are clearly a distinct population.

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[1] Alastair McNeilage et al., *Bwindi Impenetrable National Park, Uganda: Gorilla Census 1997*, 35 ORYX 39, 39–47 (2001).
[2] *Id.* at 39-47.
[3] UNEP World Conservation Monitoring Centre, REPORT ON THE STATUS AND CONSERVATION OF THE MOUNTAIN GORILLA 1 (October 2003) [hereinafter UNEP WCMC MOUNTAIN GORILLA REPORT] (citing Esteban E. Sarmiento et al., *Gorillas of Bwindi-Impenetrable Forest and the Virunga Volcanoes: Taxonomic Implications of Morphological and Ecological Differences*, 40 AMERICAN JOURNAL OF PRIMATOLOGY 1, 1-21 (1996)). The Virunga mountain gorilla population occupies areas of Mgahinga Gorilla National Park (Uganda), Volcano National Park (Rwanda), and Virunga National Park, Southern Sector (DRC).
[4] *Id.*
[5] *Id.*
[6] Craig B. Stanford, *Gorilla Warfare*, THE SCIENCES 18, 21 (July/Aug. 1999).
[7] UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 3, at 1 (citing Craig B. Stanford, *The Subspecies Concept in Primatology: The Case of Mountain Gorillas*, 42 PRIMATES 309, 309-318 (2001)).
[8] *Id.* (citing Karen Garner & Oliver Ryder, *Mitochondrial DNA Diversity in Gorillas*, 6 MOLECULAR PHYLOGENETICS AND EVOLUTION 39, 39–48 (1996)).

III. The Status of Bwindi Gorillas

Estimates in 1979 showed 95–130 Bwindi gorillas.[9] A census published in 1981 showed a total population of approximately 155 Bwindi gorillas.[10] A 1997 census estimated the BINP population at 292 individuals organized in 28 groups with 7 lone silverback males.[11] The census-takers noted that the population appeared to be stable, although no studies specifically evaluate a minimal viable population for Bwindi gorillas. The 1997 census found most of the gorillas in the southern section of the park.[12] The same census noted that there were some areas of unused habitat in the park and therefore room for the population to grow.[13] The researchers followed trails and counted nests. To reduce the possibility of missing groups or counting them twice, more survey teams were used than in the past, and the counting took place over a shorter period of time.[14] The Uganda Wildlife Division reported at least 300 Bwindi gorillas in 2002, and stated that the population is stable and may be increasing.[15] A census in 2002 showed the population increased to 315.[16] During another census in January to March 2002, a team of researchers counted about 320 gorillas in Bwindi Impenetrable National Park.[17]

Based on these population estimates, population density of Bwindi gorillas is 0.85-1.00 per km^2.[18] Bwindi gorilla groups range in size from 3 to 25 with a mean group size of 9.9 individuals.[19] Bwindi gorillas have a high number of multi-male groups, approximately 40 percent, and increased group size correlates with a greater number of silverback males.[20] Male mountain gorillas develop a silver spray of hair across their back and hips around 15–17 years of age.[21] The silver hair is a sign of maturity rather than an indication of dominance. Mountain gorillas live 40–50 years, and females generally have their first infant between the ages of 10 and 12.[22] Their gestation period is nine months,[23] and they reproduce about every four years.[24]

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[9] *Id.* at 4 (citing IUCN, THE CONSERVATION STATUS OF THE GREAT APES (The World Conservation Union, 1982)).
[10] Alexander H. Harcourt et al., *Demography of Gorilla gorilla*, 195 JOURNAL OF ZOOLOGY 215, 215-233 (1981).
[11] McNeilage, *supra* note 1, at 39-47. The Wildlife Conservation Society (WCS), International Gorilla Conservation Programme (IGCP), Institute of Tropical Forest Conservation (ITFC) and the Uganda Wildlife Authority (UWA) conducted the census.
[12] *Id.*
[13] *Id.*
[14] *New Gorilla Census in Bwindi*, 15 GORILLA JOURNAL (Dec. 1997), available at http://www.berggorilla.de/english/gjournal/texte/15censbwin.html
[15] Uganda Wildlife Division, Ministry of Tourism, Trade and Industry, UGANDA NATIONAL REPORT TO CMS (2002) (hereinafter UGANDA REPORT TO CMS), *at* http://www.cms.int/bodies/COP/cop7/proceedings/pdf/national_reports/national_report_uganda.pdf.
[16] Sarah Ferriss, *Eastern Gorilla*, *in* WORLD ATLAS OF GREAT APES AND THEIR CONSERVATION 16 (draft, not for citation).
[17] *New Gorilla Census in Bwindi*, *supra* note 7.
[18] McNeilage, *supra* note 1, at 39-47.
[19] Michele L. Goldsmith, *Comparative Behavioral Ecology of a Lowland and Highland Gorillas Population: Where Do Bwindi Gorillas Fit?*, *in* GORILLA BIOLOGY: A MULTIDISCIPLINARY PERSPECTIVE 358, 369 (Andrea B. Taylor & Michele L. Goldsmith eds. 2003).
[20] *Id.*
[21] International Gorilla Conservation Programme, *Mountain Gorillas: Some Social and Biological Data*, *at* http://www.mountaingorillas.org/pdf/gorilla_profile.pdf.
[22] *Id.*
[23] *Id.*
[24] Craig B. Stanford, *supra* note 6, at 20.

The IUCN Red List classifies the mountain gorilla as *Gorilla beringei beringei*, and lists it as Endangered.[25] IUCN also classifies the populations of mountain gorillas separately due to taxonomic uncertainty and lists Bwindi gorillas as Critically Endangered.[26] Butynski and members of the Primate Specialist Group assessed the Bwindi gorilla in 2000 for the Red List and based the Critically Endangered listing on a total surviving population of fewer than 325 individuals.[27]

This range and population are small compared with historic figures. Nonetheless, the current range within BINP and the Sarambwe Special Reserve appears sufficient to support a viable population given the stable and potentially increasing population of Bwindi gorillas. About 500 years ago, the Bwindi and Virunga mountain gorilla populations were one.[28] Subsistence farmers, however, have cleared the land between the two mountain ranges, and settled farmland remains.[29] The two mountain gorilla populations no longer mingle or interbreed, even though the Bwindi population is only about 40 km from the southern population inhabiting Mgahinga Gorilla National Park, Volcano National Park, and Virunga National Park.[30] Bwindi gorillas do travel outside of BINP along the western side of the park and into the DRC, specifically the Sarambwe Special Reserve.

A. Bwindi Impenetrable National Park

BINP is 320.92 km^2 and ranges in altitude from 1,190 m to 2,607 m.[31] Bwindi gorillas currently occupy an area of approximately 215 km^2, including some excursions into the Sarambwe Special Reserve and the farmland surrounding BINP.[32] Home ranges typically overlap extensively.[33] One study found that they used areas less than or equal to 25 km^2 and that

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[25] IUCN, Thomas M. Butynski & Members of the Primate Specialist Group 2000, 2003 IUCN RED LIST OF THREATENED SPECIES: GORILLA BERINGEI (BWINDI-IMPENETRABLE FOREST SUBPOPULATION) (hereinafter IUCN RED LIST), at http://www.redlist.org. The IUCN defines endangered as not critically endangered but facing a very high risk of extinction in the wild in the near future. This listing is based on a population reduction of at least 50%, projected or suspected to be met within the next three generations, a decline in area of occupancy, extent of occurrence, or quality of habitat, and actual or potential exploitation. IUCN, THE RED LIST OF THREATENED SPECIES: 1994 CATEGORIES AND CRITERIA (VERSION 2.3) § V.EN A2c–d, *at* http://www.redlist.org/info/categories_criteria1994.html#categories.

[26] *Id.* The IUCN defines critically endangered as a species facing an extremely high risk of extinction in the wild, based on the best available science. This listing is based on a population size estimated to number fewer than 250 mature individuals, an observed, projected, or inferred continued decline in numbers of mature individuals, and one subpopulation containing at least 90% of mature individuals. IUCN, THE RED LIST OF THREATENED SPECIES: 2001 CATEGORIES AND CRITERIA (VERSION 3.1) § V.CR C2a(ii), *at* http://www.redlist.org/info/categories_criteria2001.html#categories.

[27] *Id.*

[28] Stanford, *supra* note 6, at 21.

[29] *Id.*

[30] *Id.*

[31] UNEP World Conservation Monitoring Centre, WORLD CONSERVATION MONITORING CENTRE PROTECTED AREAS DATABASE (2001) (hereinafter UNEP WCMC DATABASE), at http://www.wcmc.org.uk/protected_areas/data/wh/bwindi.html. The coordinates of the park are 0°53´–1°08´N; 29°35´–29°50´E. *Id.*

[32] Thomas M. Butynski, *Africa's Great Apes*, *in* GREAT APES AND HUMANS: THE ETHICS OF COEXISTENCE 3, 15 (Benjamin B. Beck et al., eds. 2001).

[33] UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 2, at 4 (citing David P. Watts, *The Influence of Male Mating Tactics on Habitat Use by Mountain Gorillas (Gorilla gorilla beringei)*, 35 PRIMATES 35, 35-47 (1994)).

annual home range size and core area size varied considerably both with groups and across years.[34] An observational analysis of one Bwindi gorilla group (Kyagurilo) showed annual home range sizes of 21.8 km^2, 21.1 km^2, and 40.1 km^2 for three consecutive years.[35] Home range for the three years combined was 40.2 km^2.[36] Core area ranged between 7 and 12 km^2 for the three years.[37] Food and male mating competition can influence home range and core area size.[38]

B. Sarambwe Special Reserve

Bwindi gorillas, specifically the Katendegere group, sometimes travel out of BINP into DRC and the Sarambwe Mountains to the west of BINP. The Sarambwe Mountains are covered by 7 km^2 of forest, which is separated into 3 blocks.[39] On June 21, 2003, the Sarambwe Reserve area was granted the status of a Special Reserve.[40] Its 900 hectares include several mountains and forest patches, and part of the area is a multiple use zone. It extends from the summit of Mt. Sarambwe in the north to the border between DRC and Uganda in the east, from Kikumiliro to the source of the river Ivi in the south, and to the source of the Kanyabusinini in the west. The protected area now extends onto the DRC side of the mountain and therefore protects the sources of rivers that bring water to the Virunga National Park.[41] In the Sarambwe reserve, the greatest problem is deforestation[42] and other major problems include the large population in the surrounding villages, poaching and habitat encroachment.[43] The change in status to Special Reserve takes Sarambwe out of the remainder of the Rutshuru Hunting Domain, of which it was an integral part, and is designed to prevent poaching and protect biodiversity and the forested fringe of BINP.[44] Other measures taken to protect the reserve include reforestation and the erection of boundary demarcation plaques.[45]

IV. Threats

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[34] *Id.* (citing David P. Watts, *Long Term Habitat Use By Mountain Gorillas (Gorilla gorilla beringei): 1. Consistency, Variation and Home Range Size and Stability*, 19 INTERNATIONAL JOURNAL OF PRIMATOLOGY 651, 651-680 (1998)).

[35] Martha M. Robbins & Alastair McNeilage, *Home Range and Frugivory Patterns of Mountain Gorillas in Bwindi Impenetrable National Park, Uganda*, 24 INTERNATIONAL JOURNAL OF PRIMATOLOGY 467, 478 (2003).

[36] *Id.*

[37] *Id.* at 481.

[38] *Id.* at 487-88; UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 2, at 4 (citing David P. Watts, *Long Term Habitat Use By Mountain Gorillas (Gorilla gorilla beringei): 1. Consistency, Variation and Home Range Size and Stability*, 19 INTERNATIONAL JOURNAL OF PRIMATOLOGY 651, 651-680 (1998)).

[39] Claude S. Kiyengo, *Conservation in the Virunga National Park*, 16 GORILLA JOURNAL (June 1998), at http://www.kilimanjaro.com/gorilla/brd/06-98.html.

[40] Claude S. Kiyengo, *The Sarambwe Gorilla Special Reserve*, 27 GORILLA JOURNAL 10, 10 (Dec. 2003), at http://www.berggorilla.de/english/gjournal/texte/27sarambwe.html.

[41] *Id.*

[42] Claude S. Kiyengo, *Sarambwe Protection*, 21 GORILLA JOURNAL (Dec. 2000), at http://www.berggorilla.de/english/gjournal/texte/21saram.html.

[43] IUCN, REPORT ON THE STATE OF CONSERVATION OF NATURAL AND MIXED INSCRIBED ON THE WORLD HERITAGE LIST AND THE LIST OF WORLD HERITAGE IN DANGER 5 (Apr. 30, 2001), at http://www.iucn.org/themes/wcpa/pubs/pdfs/heritage/socreports/SOC30April2001.pdf.

[44] Claude S. Kiyengo, *The Sarambwe Gorilla Special Reserve*, 27 GORILLA JOURNAL 10, 10 (Dec. 2003), at http://www.berggorilla.de/english/gjournal/texte/27sarambwe.html.

[45] *Id.* at 11.

The major threats to Bwindi gorillas are 1) habitat loss or modification, 2) disease transmission from humans and livestock, 3) habituation, 4) war or political unrest, and 5) genetic variability. Generally, hunting and poaching are not major threats to the Bwindi gorillas; there is no evidence of current gorilla hunting in BINP.[46] However, hunting for other species, including antelope, pigs and other large mammals, occurs routinely within BINP.[47] There have been a few incidents of gorilla hunting in BINP, including the poaching of four adult gorillas in 1995.[48] In addition, there have been reports of infant gorillas being taken and sold to private collectors.[49] When BINP was created in 1991, entry to the parks was prohibited for anyone except authorized researchers.[50] This prohibition ended large-scale logging and gorilla poaching.[51]

A. Habitat Loss

Protection is total in BINP although the park Board of Trustees may permit extractive use.[52] Manual extraction of timber is permitted throughout the entire park but commercial logging operations have never occurred in the park because of its rugged terrain.[53] Relatively intensive logging and extraction of gold and charcoal occurs in certain areas, although most illegal activity has been reduced to sustainable levels.[54]

Habitat loss also stems from infrastructure development, human settlement, wood extraction, food harvesting, livestock and agricultural crops.[55] Only about 10 percent of BINP remains free of human disturbance.[56] Agricultural encroachment is the major threat to forest integrity[57] as human population and settled farmland surrounds BINP. The area has one of the highest population densities in Uganda and central Africa with more than 300 people per km^2.[58] There is virtually no forest remaining outside the boundaries of BINP.[59]

Moreover, two main roadways (not paved), one from Buhoma to Nteko and the other from Butogota to Ikumba (the Kitahurira corridor), divide BINP, fragment gorilla habitat, and provide opportunities for human settlements.[60] People (approximately 50 in 1996) use the

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[46] UNEP WCMC DATABASE, *supra* note 31.
[47] *Id.*
[48] *Id.*
[24] *Id.* (citing Ralph Johnstone, *Gorillas In Our Midst*, 20 SWARA 22, 22-23 (1997); Marie von Zeipel, *A Decade of Peace Revives Uganda's Wildlife and Gorilla Tourism*, WWF NEWS 4.96 (1996)).
[50] Ronald M. Nowak, *Uganda Enlists Locals in the Battle to Save the Gorillas*, 267 SCIENCE 1761, 1761-62 (March 1995).
[51] *Id.*
[52] UNEP WCMC DATABASE, *supra* note 31.
[53] *Id.*
[54] *Id.*
[55] IUCN RED LIST, *supra* note 25.
[56] UNEP WCMC DATABASE, *supra* note 31.
[57] *Id.*
[58] Butynski, *supra* note 32, at 37.
[59] ROBERT G. WILD & JACKSON MUTEBI, CONSERVATION THROUGH COMMUNITY USE OF PLANT RESOURCES: ESTABLISHING COLLABORATIVE MANAGEMENT AT BWINDI IMPENETRABLE AND MGAHINGA GORILLA NATIONAL PARKS, UGANDA 7 (UNESCO 1996), *at* http://peopleandplants.org/web-content%201/pdf/wp5e.pdf.
[60] Angela Meder, *Report From Uganda*, 12 GORILLA JOURNAL (June 1996), at http://www.kilimanjaro.com/gorilla/brd/06-96.htm.

Buhoma–Nteko route twice a week to access a market in Nteko.[61] A truck from a tea factory (north of Butogota) uses the route to Ikumba once daily to travel to Ruhija.[62] Park personnel have removed illegal residents living within the park.[63]

B. Disease

Disease transmission from humans to gorillas resulting from tourism and the local human population is a major threat to the Bwindi gorilla population's survival, because the introduction of a pathogen to a population without immunological defenses could result in widespread morbidity and mortality.[64] The level of interaction between humans and gorillas is high around BINP, which increases the potential for disease transmission.[65] Human fecal material poses a particular risk for disease transmission because gorillas sometimes consume feces and, according to a survey, most people in and around the park do not bury their fecal waste (although only a few reported defecating in the forest).[66]

An outbreak of scabies occurred in a gorilla group in BINP in 1996[67] that caused the death of one infant male. Three other gorillas required injection treatment and survived. An outbreak of scabies also occurred in 2000.[68] This outbreak did not result in any fatalities. The cause of the outbreaks is not confirmed, but the disease is prevalent in the human population and livestock around the park.[69]

C. Habituation

Habituation to tourism and study has resulted in significant behavioral changes in Bwindi gorillas including increased stress, foraging and sleeping outside of park boundaries, reduced day ranges, shifts in diet, and aggressive contact with local farmers. The stress of repeated human contact has resulted in higher parasite burdens on habituated Bwindi gorillas than non-habituated gorillas.[70] Before habituation for tourism, Bwindi gorillas rarely slept outside of the park

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[61] *Id.*
[62] *Id.* This road is graded occasionally. *Id.*
[63] In 1996, illegal residents were removed from an area within the national park along the Mbwa River Tract. They received compensation and removed their huts. *Id.*
[64] William Guerrera et al., *Medical Survey of the Local Human Population to Determine Possible Health Risks to the Mountain Gorillas of Bwindi Impenetrable Forest National Park, Uganda*, 24 INTERNATIONAL JOURNAL OF PRIMATOLOGY 197, 198 (Feb. 2003).
[65] *Id.* at 205.
[66] *Id.*
[67] UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 3, at 7 (citing Gladys Kalema-Zikusoka et al., *Scabies in Free Ranging Gorillas (Gorilla beringei beringei) in Bwindi Impenetrable National Park, Uganda*, 150 THE VETERINARY RECORD 12, 12-15 (2002)).
[68] Antoine Mudakikwa, *An Outbreak of Mange Hits the Bwindi Gorillas*, 22 GORILLA JOURNAL, available at http://www.berggorilla.de/english/gjournal/texte/22scabies.html.
[69] UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 3, at 7 (citing Gladys Kalema-Zikusoka et al., *Scabies in Free Ranging Gorillas (Gorilla beringei beringei) in Bwindi Impenetrable National Park, Uganda*, 150 THE VETERINARY RECORD 12, 12-15 (2002)).
[70] Butynski, *supra* note 32, at 37 (citing Gladys Kalema, *Epidemiology of the Intestinal Parasite Burden of Mountain Gorillas, Gorilla gorilla beringei, in Bwindi Impenetrable National Park, Southwest Uganda*, ZEBRA FOUNDATION NEWSLETTER 18, 18-34 (Autumn 1995)).

boundaries and did not attack local farmers.[71] By 2000, seven years after the start the tourism program, habituated groups spent more time foraging and sleeping outside the park boundaries in settled farmland than non-habituated groups.[72] One habituated group spent 35 of 36 consecutive days foraging and sleeping outside the park, and another group shift to full-time foraging on farmland for eight-months.[73] These habituated gorillas demonstrate different diets and greatly reduced day ranges while foraging outside the park.[74] While foraging in settled farmland, habituated gorillas have also attacked local farmers including at least four attacks during a ten-month period in 1996 to 1997.[75] This increased contact with the human population due to habituation also increases the likelihood of exposure to disease (discussed above). There are no studies that adequately evaluate any potential impacts on vitality and reproduction from habituation.[76]

Butynski noted in 1998 that there was a sizeable loss of gorillas from one of the two tourist groups in BINP. The Katendegere group declined from 9 gorillas to 3 as a result of emigration and death, and a tenth gorilla was born and died during this decline. In addition, this group now ranges 10 km east of where it occurred in 1993 prior to visits by tourists.[77]

D. Political Unrest

In 1999, a group of more than a hundred former Rwandan rebels entered BINP from DRC and attacked the tourist center at Buhoma.[78] The rebels acted in opposition to the Ugandan government, which supported the Rwandan government during the 1994 conflict.[79] The rebels burned the tourist center and killed the deputy warden. They also kidnapped fourteen Western tourists and researchers, killing eight of them.[80] This incident paralyzed scientific research and tourism in BINP for about a month.[81] Fortunately, no gorillas were harmed during the incident although it demonstrates the volatile politics of the region and the potential for harm to gorillas.

E. Lack of Genetic Variability

The low numbers and isolation of the Bwindi gorillas have created concerns about inbreeding. Although genetic testing indicated that Bwindi and Virunga gorilla mitochondrial DNA exhibited low variability,[82] more extensive sampling is needed.

V. Current Protection Measures

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[71] *Id.*
[72] *Id.*
[73] *Id.*
[74] *Id.*
[75] *Id.*
[76] *Id.*
[77] Thomas M. Butynski, *Is Gorilla Tourism Sustainable?*, 16 GORILLA JOURNAL (June 1998), at http://www.berggorilla.de/english/frame.html
[78] Stanford, *supra* note 6, at 18, 22.
[79] *Id.*
[80] *Id.*
[81] *Tourist Killings in Buhoma*, 18 GORILLA JOURNAL (June 1999), at http://www.berggorilla.de/english/frame.html.
[82] UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 3, at 7 (citing Karen Garner & Oliver Ryder, *Mitochondrial DNA Diversity in Gorillas*, 6 MOLECULAR PHYLOGENETICS AND EVOLUTION 39, 39-48 (1996)).

A. Domestic Measures

The Uganda Wildlife Authority (UWA) is the primary governmental body charged with management of BINP, Bwindi gorillas, and Uganda's other national parks. UWA has a relatively high level of functional autonomy and can adopt most conservation initiatives unilaterally.[83] UWA took over park management responsibility in 1996, created by the merger of Uganda National Parks and the Game Department. From 1991–96, Uganda National Parks managed the parks.[84] From the 1930s until 1991, the Forest Department and Game Department managed the forests cooperatively.

Protection is total in BINP although the UWA Board of Trustees may permit extractive use.[85] Commercial logging operations have never occurred in the park because of its rugged terrain, but manual extraction of timber has occurred throughout the entire park.[86] When Uganda gazetted BINP from a forest reserve in 1991, it prohibited entry to the parks for anyone except authorized researchers.[87] The park opened for gorilla tourism in 1993 after the development of a tourism plan, and there has been an average of US $1 million per year in gorilla tourism revenue.[88] To guard against unnecessary contact between humans and gorillas, the UWA limits veterinary intervention to diseases caused by human beings or life-threatening conditions, and does not provide medical attention for less serious, naturally occurring health conditions.[89] Other measures intended to reduce gorilla contact with humans include limiting the approach of humans to 5 meters, burying human excrement deeper than 30 cm and chasing gorillas from private lands surrounding the parks.[90]

Domestic legislation prohibits the taking of protected species, including the mountain gorilla.[91] The Uganda Wildlife Statute, No. 14 of 1996 states that "species which migrate to or through Uganda which are protected under any international convention or treaty to which Uganda is a party . . . shall be protected species under this Statute."[92] Due to their protected

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[83] ANNETTE LANJOUW ET AL., BEYOND BOUNDARIES: TRANSBOUNDARY NATURAL RESOURCE MANAGEMENT FOR MOUNTAIN GORILLAS IN THE VIRUNGA-BWINDI REGION ch. 4, at 5 (Biodiversity Support Program 2001), *at* http://www.worldwildlife.org/bsp/publications/africa/126/titlepage.HTML.
[84] WILD & MUTEBI, *supra* note 59, at 6.
[85] UNEP WCMC DATABASE, *supra* note 31
[86] UNEP WCMC DATABASE, *supra* note 31.
[87] Ronald M. Nowak, *Uganda Enlists Locals in the Battle to Save the Gorillas*, 267 SCIENCE 1761, 1761-62 (March 1995).
[88] UNEP WCMC DATABASE, *supra* note 31.
[89] UNEP World Conservation Monitoring Centre, REPORT ON THE STATUS AND CONSERVATION OF THE MOUNTAIN GORILLA 7 (October 2003) (hereinafter UNEP WCMC MOUNTAIN GORILLA REPORT) (citing Gladys Kalema-Zikusoka et al., *Scabies in Free Ranging Gorillas (Gorilla beringei beringei) in Bwindi Impenetrable National Park, Uganda*, 150 THE VETERINARY RECORD 12, 12-15 (2002)).
[90] *Id.*
[91] Uganda Wildlife Statute, No. 14 (1996), § 28, *at* http://faolex.fao.org/docs/texts/uga9000.doc; National Environmental Statute, No. 3 (1995); National Environmental Statute, No. 4 (1996). *See* UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 3, at 8.
[92] Uganda Wildlife Statute, No. 14 (1996), § 28(2), *at* http://faolex.fao.org/docs/texts/uga9000.doc; UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 3, at 8.

status under the various international agreements to which Uganda is a party, especially CMS,[93] mountain gorillas are included under the domestic legislation. Penalties for taking, molesting, possessing, selling, or buying a protected species include a minimum fine of one million shillings, a maximum term of five years in prison, or both.[94] If licensed hunters or trappers take or harm a protected animal, their licenses are also revoked.[95] Penalties for export, import, or re-export of protected specimens include a minimum fine of ten million shillings or a minimum prison term of seven years.[96]

Uganda has established several programs to mitigate the loss felt by local people due to the creation of the park and the accompanying loss of resources.[97] Programs include agreements allowing controlled harvest of the park's resources, giving locals a share of tourism revenue, and creating a trust fund used, in part, for community development.[98] The Mgahinga and Bwindi-Impenetrable Forest Conservation Trust was set up in 1995 and now provides a sustainable source of funding for park management, research, and community conservation projects.[99] The goal for the trust is $10 million or more, with an annual return of $700,000 to fund programs.[100] The involvement of local communities in conservation, or collaborative management, is reflected in Strategic Programme 5 of the UWA's Strategic Plan 2002–2007.[101] Collaborative management relates to management of wildlife and protected areas or parts thereof in collaboration with strategic partners, including local communities, the private sector, NGOs, local governments, other government agencies in the natural resources sector, protected area authorities in neighboring countries, and international treaty organizations.[102]

B. Programs of Non-Governmental and Intergovernmental Organizations

Several projects and organizations are already mobilized to protect Bwindi gorillas. To prevent against the duplication of existing work, any future conservation efforts must tap into the knowledge, resources, and experience of these organizations. The Great Ape Survival Project (GRASP), developed by the United Nations Environment Programme (UNEP) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), in collaboration with numerous partners, aims to lift the threat of imminent extinction faced by gorillas and other

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[93] CMS explicitly prohibits the taking of mountain gorillas and, therefore, is the most protective international agreement to which Uganda is a party. Convention on the Conservation of Migratory Species of Wild Animals, art. III.5, June 3, 1979, *reprinted in* 19 I.L.M. 15 (entered into force Nov. 1, 1983) [hereinafter CMS].
[94] Uganda Wildlife Statute, No. 14 (1996), § 76, *at* http://faolex.fao.org/docs/texts/uga9000.doc.
[95] *Id.* § 83.
[96] *Id.* § 77.
[97] Alan Hamilton et al., *Conservation in a Region of Political Instability: Bwindi Impenetrable Forest, Uganda,* 14 CONSERVATION BIOLOGY, 1722, 1722-25 (2000).
[98] Hamilton et al., *supra* note 97, at 1722–25.
[99] Andrew J. Plumptre et al., *The Current Status of Gorillas and Threats to Their Existence at the Beginning of a New Millenium, in* GORILLA BIOLOGY: A MULTIDISCIPLINARY PERSPECTIVE 414, 425–26 (Andrea B. Taylor & Michele L. Goldsmith eds. 2003). The Global Environment Facility, the United States Agency for International Development, and the Netherlands government provided funding for the trust. *Id.*
[100] *Id.* at 426.
[101] JACKSON MUTEBI, CO-MANAGED PROTECTED AREAS: FROM CONFLICT TO COLLABORATION, EXPERIENCE IN BWINDI IMPENETRABLE NATIONAL PARK, UGANDA 5 (CARE Uganda 2003).
[102] *Id.*

primates.[103] GRASP has developed a global strategy and survival plans, and seeks to raise funds for conservation projects.[104] GRASP is also developing The World Atlas of Great Apes and Their Conservation, designed to provide current information on the distribution, status, and conservation of great apes.[105]

The Institute of Tropical Forest Conservation (ITFC) was established in 1991 as a faculty and research facility of Mbara University Institute of Science and Technology.[106] ITFC's main objectives are to preserve the biological diversity of Uganda's tropical forests and enhance the environmental quality of life of the Ugandan people.[107] ITFC also aims to systematically inventory the flora and fauna of BINP, initiate conservation programs, and assess the population, distribution, and particular requirements of mountain gorillas.[108] The Impenetrable Forest Conservation Project (IFCP), established by the World Wildlife Fund for Nature (WWF) in 1986, was institutionalized as the ITFC in 1991. IFCP was set up at Ruhija and the site now contains a library, laboratory equipment, and accommodation and facilities for up to sixty people.[109] IFCP supported the Game and Forest Departments in conservation and gorilla research and initiated the Development Through Conservation (DTC) project.[110]

DTC, managed by CARE International and funded by the United States Agency for International Development (USAID), is an integrated conservation and development project supporting conservation and appropriate development activities around BINP.[111] DTC has created low impact resource use projects, established buffer zones, and supported sustainable agriculture, agro-forestry, and other development activities in an effort to promote good relations with the local community.[112]

The International Gorilla Conservation Programme (IGCP) is a collaboration of the African Wildlife Foundation, WWF, Fauna and Flora International, and the national protected area authorities, dedicated to the conservation of mountain gorillas and their habitat.[113] IGCP supports the development of gorilla tourism, provides guidance on methods to reduce risks of disease transmission between resource users and gorillas, and advises on the prevention of behavioral disturbance or range alteration of gorilla groups.[114] IGCP also assisted with population censuses and the development of controlled multiple use areas consistent with conservation.[115] Additionally, IGCP is developing a regional approach to mountain gorilla

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[103] UNEP, GREAT APE SURVIVAL PROJECT – GRASP, at http://www.unep.org/grasp/.
[104] UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 3, at 8.
[105] UNEP WORLD CONSERVATION MONITORING CENTRE, THE WORLD ATLAS OF GREAT APES AND THEIR CONSERVATION, *at* http://www.unep-wcmc.org/index.html?http://www.unep-wcmc.org/species/GRASP/~main.
[106] WILD & MUTEBI, *supra* note YY, at 6.
[107] *Id.*
[108] UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 3, at 10.
[109] *Id.*
[110] WILD & MUTEBI, *supra* note 59, at 6.
[111] *Id.*
[112] *Id.*; UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 3, at 10.
[113] INTERNATIONAL GORILLA CONSERVATION PROGRAMME, ABOUT THE INTERNATIONAL GORILLA CONSERVATION PROGRAMME, *at* http://www.mountaingorillas.org/about_igcp/about_igcp.htm.
[114] WILD & MUTEBI, *supra* note 59, at 6.
[115] *Id.*; UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 3, at 8.

conservation and increasing cooperation between the protected area authorities of the three mountain gorilla range states.[116]

The Bwindi-Impenetrable Great Ape Project (BIGAPE), established in 1996, aims to better understand the ecological relationship between mountain gorillas and chimpanzees (*Pan troglodytes schweinfurthii*), which both reside in BINP.[117] The project studies the behavior, ecology, and habitat of both species.[118] The project runs a research station, Camp Kashasha, built in 1998.[119]

VI. Proposals for Implementing the World Heritage Species Concept for Bwindi Gorillas

Several international agreements currently regulate conservation of Bwindi gorillas, although gaps still remain in their protection. For example, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) [120] lists all species of gorilla (*Gorilla gorilla*) in Appendix I as threatened with extinction and, thus, bans all international commercial trade in gorillas and their parts. However, international trade does not represent a serious threat to Bwindi gorillas.[121]

Other international agreements remain underused. For example, BINP was established as a World Heritage Site in 1994 under the Convention Concerning the Protection of the World Cultural and Natural Heritage (WHC).[122] Nonetheless, Uganda does not appear to have successfully marketed BINP as the Bwindi *Mountain Gorilla* National Park. Nor has it successfully engaged the DRC to propose a transboundary world heritage site. Similarly, the Convention on the Conservation of Migratory Species of Wild Animals (CMS) lists the mountain gorilla (*Gorilla gorilla beringei*) in Appendix I as an endangered species,[123] which requires range States must prohibit takings,[124] maintain and restore the species' habitat, and minimize obstacles to migration.[125] Yet, the Uganda and DRC are parties to CMS, have never pursued an "Article IV agreement," which could bring these two parties into negotiations with

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[116] UNEP WCMC MOUNTAIN GORILLA REPORT, *supra* note 3, at 8.
[117] *Id.* at 10–11.
[118] *Id.* at 11.
[119] *Id.*
[120] Convention on International Trade in Endangered Species of Wild Fauna and Flora, Mar. 3, 1973, 27 U.S.T. 1087, 993 U.N.T.S. 243 (entered into force July 1, 1975) [hereinafter CITES], arts. II.1, III, *at* http://www.cites.org/eng/app/appendices.shtml.
[121] CITES may provide some technical assistance to the extent that bushmeat trade, whether domestic or international, becomes a more serious threat. The range states of mountain gorillas, Uganda, DRC, and Rwanda, are all parties to CITES. CITES, *List of Contracting Parties*, *at* http://www.cites.org/eng/disc/parties/alphabet.shtml.
[122] Convention Concerning the Protection of the World Cultural and Natural Heritage, Nov. 23, 1972, 27 U.S.T. 37, TIAS No. 8226 (entered into force Dec. 17, 1975), *available at:* http://whc.unesco.org/pg.cfm?cid=182 [hereinafter World Heritage Convention].
[123] CMS, *supra* note 93, at Appendix I, *at* http://www.cms.int/documents/appendix/cms_app1.htm. Bwindi gorillas are currently classified as mountain gorillas and, therefore, are covered in this Appendix I listing.
[124] *Id.* art. III.5. CMS allows exceptions to the prohibition against takings for scientific purposes and "exceptional circumstances."
[125] *Id.* at art. III.4.

Rwanda as a non-Party to develop a species-specific and site-specific management plan.[126] Yet other agreements, such as the African Convention on the Conservation of Nature and Natural Resources (African Convention), do not have the institutional structure to provide technical assistance or other strategies to help and encourage the Parties to implement their obligations.[127]

To benefit Bwindi gorillas, Uganda and the DRC should focus greater attention on implementation of international agreements that seek the participation of local people, foster improved cooperation and coordination between the two range States, coordinate existing conservation efforts within Uganda, and provide expertise and funding for gorilla conservation projects. First, because Bwindi gorillas move across the Uganda border and into the DRC, specifically the Sarambwe Special Reserve, increased communication and coordination between the two countries can reduce potential threats to Bwindi gorilla conservation and increase the effectiveness of existing conservation efforts. For example, cooperation between the national protected area authorities in Uganda and the DRC has led to more uniform gorilla tourism practices, which, in turn, reduces the risk of disease transmission and habituation.[128] The unstable political situation in the region, however, presents a substantial barrier to formal legal cooperation between the countries.[129] As a result, any additional involvement of international obligations must be flexible and developed with the cooperation of local communities.

Second, coordination of existing conservation efforts within Uganda prevents duplicate work and improves the cost effectiveness of current endeavors. Although there are not reported instances of duplicate Bwindi gorilla conservation efforts occurring in BINP, the large number of NGOs, IGOs, and national authorities working in the park increases the possibility of different organizations independently laboring on the same or similar projects. An overarching strategy with coordination between the relevant interests prevents duplication and results in targeted spending of financial resources. GRASP's Global Strategy for the Survival of Great Apes[130] plays an important role in this overarching strategy, but it is not as narrowly focused or species-specific as the World Heritage Species concept.

Third, several international bodies can provide increased funding for conservation projects. Beyond funding, international bodies often have significant expertise managing protected species and developing land use strategies for local human populations. Tapping into

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[126] CMS, *Parties to the Convention on the Conservation of Migratory Species of Wild Animals*, *at* http://www.cms.int/pdf/en/party_list/Partylist_eng.pdf.

[127] The African Convention lists all species of gorilla (*Gorilla gorilla*) in Class A. Class A includes endangered species, which parties must completely protect throughout their territory, with exceptions for scientific purposes or interests of national importance African Convention on the Conservation of Nature and Natural Resources, Sept. 15, 1968, 1001 U.N.T.S. 4, O.A.U. Doc. CAB/LEG/24.1, art. VIII.1(a), (entered into force June 16, 1969) [hereinafter African Convention], List of Protected Species, *at* http://www.africa-union.org/Official_documents/Treaties_%20Conventions_%20Protocols/Convention_Nature%20&%20Natural_Resources.pdf. Uganda, DRC, and Rwanda are parties to the African Convention. African Convention, Signatories, *at* http://www.africa-union.org/Official_documents/Treaties_%20Conventions_%20Protocols/Convention_Nature%20&%20Natural_Resources.pdf

[128] ANNETTE LANJOUW ET AL., *supra* note 83, ch. 3, at 9–11.

[129] *Id.* ch. 3, at 13.

[130] UNEP–UNESCO, GLOBAL STRATEGY FOR THE SURVIVAL OF GREAT APES, U.N. Doc. UNEP/UNESCO/GRASP/Prep.Com.1/2/Rev 2 (2003) [hereinafter GLOBAL STRATEGY].

additional sources of funding and expertise reduces threats to Bwindi gorillas, particularly habitat degradation, by providing local populations with alternative means of survival beyond reliance on BINP's natural resources. Because of the resource needs of the dense human population surrounding BINP, the involvement of the local community in conservation efforts is critical to effective management of BINP.

A. Man and Biosphere Programme

UNESCO's Programme on Man and the Biosphere (MAB)[131]may provide the best opportunity for improved conservation efforts of Bwindi gorillas, because it specifically incorporates the involvement of the local community into its management structure. MAB supports the creation of "biosphere reserves," which are areas of terrestrial and coastal ecosystems promoting solutions to reconcile the conservation of biodiversity with its sustainable use.[132] They are internationally recognized, nominated by national governments, and remain under sovereign jurisdiction of the states where they are located.[133] Biosphere reserves are not covered by an international convention but must simply meet a set of criteria allowing them to fulfill three basic, mutually reinforcing functions.[134] First, the area should have a "conservation function"; that is, it should contribute to the conservation of landscapes, ecosystems, species and genetic variation.[135] Second, the area should have a "development function"; that is, it should foster economic and human development that is socio-culturally and ecologically sustainable.[136] Third, the area should have a "logistic function"; that is, it should provide support for research, monitoring, education and information exchange related to local, national, and global issues of conservation and development.[137] Biosphere Reserves should have core areas that are strictly protected that are surrounded by rings of increased economic activity.

MAB's focus on a development function as well as its zoning framework are particularly important for effective conservation of BINP and its mountain gorillas. Although designed to protect the forest and its species, Uganda's gazetting of the Bwindi Impenetrable Forest Reserve as a National Park in 1991 created a great deal of local opposition to the Park and the gorillas inhabiting it. Prior to the establishment of the Park, local inhabitants of the region relied on the park area for beekeeping, medicinal plant gathering, basketry materials, pitsawing, hunting, fishing, and gold mining. Uganda put an end to all of these activities in 1991 when it declared them illegal within park boundaries and closed[access to the park except for authorized researchers. As a result of the park's inaccessibility, local inhabitants manifested resentment towards the park and its gorillas, as is reflected in the following statements:

- "When you mention the National Park, we want to vomit."[138]

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[131] UNESCO, Programme on Man and the Biosphere (1970) [hereinafter MAB], *at* http://www.unesco.org/mab/index.htm.
[132] MAB, *Frequently asked questions on biosphere reserves*, *at* http://www.unesco.org/mab/nutshell.htm.
[133] *Id.*
[134] MAB, *The Statutory Framework of the World Network of Biosphere Reserves*, art. 3, *at* http://www.unesco.org/mab/docs/statframe.htm.
[135] *Id.* art. 3(i).
[136] *Id.* art. 3(ii).
[137] *Id.* art. 3(iii).
[138] WILD & MUTEBI, *supra* note 59, at 9.

- "The chased we local people from the forest after it was sold to Bazungu (white people)."[139]
- "Gorillas should be put in cages and taken to zoos."[140]

Beyond vocal resentment, locals began a war of attrition against the park. There was open conflict between game guards and local residents.[141] Community members were on permanent standby to warn pitsawers and gold miners of the approach of patrols.[142] On a number of occasions, violence erupted and game guards were attacked and beaten, refused the sale of food, falsely accused of rape, and refused ambulance and burial services.[143] During a drought following the gazetting of BINP, sixteen fires started, and a third were started deliberately or allowed to enter the park from outside.[144] Local inhabitants even helped extinguish fires and then deliberately restarted them.[145] Roughly five percent of Bwindi forest burnt, including some areas not known to have burnt before.[146] There is also a risk of park reoccupation in times of institutional or national upheaval or at moments of government weakness.[147] For example, politicians in 1993 were campaigning on promises of giving Mgahinga National Park back to the people.[148] Most critically, residents directly threatened to poach gorillas.[149] The gorillas came to represent all the problems the local community faced from conservation.[150]

The structure of Uganda's government amplifies the need for local involvement in gorilla protection. Uganda governmental authority is largely grassroots and decentralized, with the majority of day-to-day activities governed by local villages and parishes.[151] BINP cuts across district boundaries, with three districts, Kisoro, Kabala, and Kanungu, containing parts of BINP.[152] Both districts and parishes emphasize their autonomy and independence.[153] Twenty-two parishes are immediately adjacent to the park boundaries.[154]

Clearly, local involvement with Park and gorilla protection is an essential element to an effective conservation regime. All of the current threats facing gorillas can be either magnified or ameliorated by the involvement of local residents. For example, when gorillas travel outside the park boundaries and on to cultivated land, the potential for conflict between gorillas and local residents is high.[155] To prevent against local resentment and potential harm to gorillas, special ranger groups composed of park ranger and local residents patrol the boundary areas, herd

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[139] MUTEBI, *supra* note 101, at 8.
[140] WILD & MUTEBI, *supra* note 59, at 9.
[141] *Id.*
[142] *Id.*
[143] *Id.* at 9, 13.
[144] *Id.* at 12.
[145] *Id.*
[146] *Id.*
[147] *Id.* at 13.
[148] *Id.*
[149] *Id.* at 9.
[150] *Id.* at 13.
[151] *Id.* at 5.
[152] MUTEBI, *supra* note 101, at 9.
[153] *Id.*
[154] *Id.*
[155] LANJOUW ET AL., *supra* note 83, ch. 3, at 12.

gorillas back into the forest, train villagers how to avoid conflict with gorillas, and help them assess crop damage.[156] This measure demonstrates how an invested local community can directly assist the conservation of gorillas. One local community member stated, "The reality is, no matter how many rangers you have, you will not be able to control people going into the park."[157] With a park boundary of about 115 km and a patrol staff of twenty-four, this statement accurately describes the need for local involvement.[158]

To involve the local community in the management of the park, Uganda National Parks (predecessor to the Uganda Wildlife Authority) and Development Through Conservation (DTC) developed a pilot resource-sharing program.[159] UNP requested twenty percent of the park be identified for resource use.[160] The program involved three of the heavy resource dependent parishes.[161] DTC held parish workshops with community leaders and UNP to negotiate which activities would be allowed in the park.[162] These workshops resulted in non-binding Memoranda of Understanding (MOU) on implementation methods, designated resource users, quantities harvested, which species, and the timing of harvesting.[163] UNP approved the gathering of materials for medicines and basketry, beekeeping, and the creation of footpaths.[164] This negotiation process was aimed at minimizing contact with gorillas while improving community relations. In addition, the process resulted in resource substitution efforts to minimize the community's dependency on the park.[165]

The program also resulted in the creation of a zoning system. The program outlined four main park zones: high protection, tourism, multiple-use, and sustainable development.[166] The high protection zone is a core conservation area, completely protected and restricted.[167] The tourism zone along the western edge of the park bordering the DRC is for controlled gorilla tourism.[168] The multiple-use zone is open to regulated resource extraction but under the ultimate authority of the Uganda Wildlife Authority.[169] The sustainable development zone is outside the

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[156] *Id.*
[157] WILD & MUTEBI, *supra* note 59, at 12.
[158] *Id.* The number of patrol staff is based on a 1996 report. *Id.*
[159] For a summary of the resource sharing program and its background, see Tom Blomley, *Natural Resource Conflict Management: The Case of Bwindi Impenetrable and Mgahinga Gorilla National Parks, South Western Uganda*, *in* NATURAL RESOURCE CONFLICT MANAGEMENT CASE STUDIES: AN ANALYSIS OF POWER, PARTICIPATION AND PROTECTED AREAS 231 (A. Peter Castro & Erik Nielsen eds. 2003), *at* ftp://ftp.fao.org/docrep/fao/005/y4503e/y4503e11.pdf.
[160] *Id.* at 14.
[161] *Id.* at 27.
[162] *Id.* at 20–27.
[163] *Id.* at 14–29.
[164] *Id.* at 23.
[165] *Id.* at 30. The substitution and resource extraction programs were based, in part, on preliminary surveys of the resource needs of the surrounding communities. For one survey, see A.B. CUNNINGHAM, THE MANAGEMENT OF NON-WOOD FOREST PRODUCTS IN PROTECTED AREAS: LESSONS FROM A CASE-STUDY OF MULTIPLE-USE IN BWINDI-IMPENETRABLE NATIONAL PARK, UGANDA (UNESCO).
[166] WILD & MUTEBI, *supra* note 59, at 15, 35–36.
[167] *Id.*
[168] *Id.*
[169] *Id.*

park, where the majority of the affected communities are located.[170] The Uganda Wildlife Authority provides assistance to the local community in this area.[171]

Although it unclear whether the current zoning program will be sufficient to meet the resource needs of the local communities, it is clear that their attitude has shifted towards BINP and the gorillas.[172] In 1995, poachers killed gorillas in BINP in an area far from the pilot multiple-use parishes.[173] Community leaders in one of the pilot parishes vehemently condemned the killings and asserted that if the poachers had come from their parish, they would not have escaped.[174] This statement reflects a greater willingness to participate in gorilla protection. Additionally, the risk of inhabitants setting forest fires and beekeepers setting snares has been greatly reduced.[175]

The current resource sharing program and zoning framework for BINP can benefit from MAB. Designation as a biosphere reserve provides scientific and technical expertise, publicity, and limited funding. First, the collective biosphere reserves form a World Network, which fosters the exchange of information, experience, and personnel among reserves.[176] Examples of exchanges include research results or experience in resolving specific issues, scientific research and monitoring, environmental education and specialist training, information materials, articles in the MAB international bulletin, personnel swaps, organized visits, and correspondence by mail or electronic mail.[177] MAB also encourages the creation of regional or thematic sub-networks, such as AfriMAB, which aims at promoting regional cooperation in the fields of biodiversity conservation and sustainable development through trans-border projects.[178] To facilitate AfriMAB, specific thematic sub-networks were created on zoning, local communities, trans-boundary cooperation, and logistic support.[179] MAB has an accumulated thirty years experience in almost 100 countries testing and demonstrating approaches to conservation and sustainable development,[180] which can provide valuable information and expertise to assist the Uganda Wildlife Authority with its development of resource-sharing projects. Second, MAB encourages the promotion of biosphere reserves, for example, with commemorative plaques and the dissemination of information materials.[181] BINP can benefit from the added status of a biosphere reserve and can be promoted as such to tourists and financial donors. Third, MAB is funded by UNESCO and can provide an additional source of funding, albeit minimal. UNESCO

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[170] *Id.*
[171] *Id.*
[172] *Id.* at 39–40.
[173] *Id.*
[174] *Id.*
[175] *Id.*
[176] MAB, *Statutory Framework*, *supra* note 134, at art. 7; MAB, *Frequently asked questions on biosphere reserves*, *at* http://www.unesco.org/mab/nutshell.htm.
[177] MAB, *Frequently asked questions on biosphere reserves*, *at* http://www.unesco.org/mab/nutshell.htm.
[178] MAB, *Statutory Framework*, *supra* note 134, at art. 8; MAB, Regional Networks, *at* http://www.unesco.org/mab/networks.htm. This network was created by the Regional Conference for Forging Co-operation on Africa's Biosphere Reserves for Biodiversity Conservation and Sustainable Development, which took place in Dakar, Senegal in 1996. *Id.*
[179] MAB, Regional Networks, *supra* note 178.
[180] MAB, *Frequently asked questions on biosphere reserves*, *at* http://www.unesco.org/mab/nutshell.htm.
[181] MAB, *Statutory Framework*, *supra* note 134, art. 6.

is required to seek financial support for reserves from bilateral and multilateral sources.[182] Any additional funding can only assist the Uganda Wildlife Authority with its conservation efforts.

To qualify as a biosphere reserve, MAB requires that the area 1) represent a major bio-geographic region, 2) contain significant ecosystems or animals that need conservation, 3) provide an opportunity to explore approaches to sustainable development on a regional scale, 4) be of appropriate size to serve the three functions of biosphere reserves, and 5) have an appropriate zoning system with a core legally protected area, a buffer zone, and an outer transition area where sustainable resource management practices are promoted and developed.[183] Additionally, provisions should be made for mechanisms to manage human use and activities in the buffer zone, a management plan for the area, a designated authority to implement the plan, and programs for research, monitoring, education, and training.[184] This zoning scheme is applied in many different ways to accommodate geographical conditions, socio-cultural settings, available legal protection measures, and local constraints. This flexibility can be used creatively and is one of the strongest points of the biosphere reserve concept.[185] BINP meets all of MAB's requirements, particularly since a pilot zoning system has been developed for the park. Furthermore, BINP's status as a World Heritage Site does not prevent designation as a biosphere reserve.[186] Finally, GRASP also recommends fostering international cooperation to conserve great ape habitat through the creation and expansion of MAB biosphere reserves in its Global Strategy for the Survival of Great Apes.[187]

B. Convention on Migratory Species

Effective conservation of BINP and mountain gorillas requires transboundary cooperation between Uganda, Rwanda, and the DRC. For example, regional cooperation is necessary for dealing with poachers crossing borders, controlling fires burning along a border zone, and monitoring gorilla groups moving across borders.[188] The efforts of the International Gorilla Conservation Programme (IGCP) to increase regional collaboration between mountain gorilla range states illustrate the need for more formal cooperation between Rwanda, the DRC, and Uganda. Beginning in 1979 with the initiation of the Mountain Gorilla Project in Rwanda, the protected area authorities in Uganda, Rwanda, and the DRC established contacts at the headquarters level, although generally on an informal basis.[189] Regional forums on the conservation of afro-montane forests occurred in 1989, 1992, and 1994, providing an opportunity for countries with these forests, including the DRC, Rwanda, and Uganda, to forge links and contacts with the objective of improving the management of trans-frontier protected areas.[190] These conferences were organized sporadically, however, and follow-up between the meetings was superficial.[191] In 1991, IGCP and the three protected area authorities agreed to work together

[182] *Id.* art. 10.
[183] *Id.* art. 4.
[184] *Id.*
[185] MAB, *Frequently asked questions on biosphere reserves*, *at* http://www.unesco.org/mab/nutshell.htm.
[186] *Id.*
[187] GLOBAL STRATEGY §§ 20, 38(a)(ii).
[188] LANJOUW ET AL., *supra* note 83, ch. 4, at 2.
[189] *Id.* ch. 3, at 2.
[190] *Id.*
[191] *Id.*

toward the conservation of mountain gorillas, with IGCP developing a phased framework for regional collaboration.[192]

The first phase focused on harmonizing and coordinating management approaches and developing field-based, informal mechanisms for collaboration.[193] Measures included regular communication between wardens and management staff of the parks, sharing of information on the situation in the parks, and joint planning and implementation of activities.[194] Specifically, IGCP helped develop common communication protocols and mechanisms, radio links between park headquarters, quarterly regional meetings, a Park Ranger monitoring program of the parks for human use, field maps, a database, staff trainings, joint surveillance and anti-poaching patrols, coordinated censuses, common tourism rules (minimum seven meters distance, six people per group, one group per day), tourism linked enterprises for the local community, tourism revenue sharing (with the Mgahinga and Bwindi-Impenetrable Forest Conservation Trust), and trainings of locals to care for the park.[195] These efforts, especially the quarterly meetings, created a team spirit channeled towards protecting the parks.[196] Despite the conflict in the region during the 1990s, field-based collaborations continued, which strengthened the ability of the protected area authorities to effectively manage the parks, demonstrated the potential economic and ecological value of the forest, and slowly increased the value attributed to environmental issues.[197] These informal field-based measures have laid the groundwork for more formal cooperation under an international agreement.

The second phase formalizes the field-based measures, but regional instability has prevented implementation of this process.[198] Formalization of field-based coordination and collaboration is necessary to ensure that measures are institutionalized and not dependent on specific individuals who know and trust one another.[199] In order to provide the structure and principles for sustained collaboration over time and through changing political and economic circumstances, the processes and activities involved in regional collaboration must be included in strategic and operational planning, along with allocations of time and resources.[200] For example, the governments of the three countries have supported joint surveillance and anti-poaching patrols including military and park staff, but legal tools must be formalized to continue these cross-border efforts, particularly in times of conflict and distrust.[201] Tourism can provide the economic incentive necessary to formalize an international agreement between the countries. Sharing investment costs, such as training, development of interpretive manuals, and marketing,

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[192] *Id.* ch. 3, at 3–4.
[193] *Id.*
[194] *Id.* ch. 3, at 5.
[195] *Id.* ch. 3, at 6–8, 10–12.
[196] *Id.* ch. 3, at 7.
[197] *Id.* ch. 3, at 5.
[198] *Id.* ch. 3, at 5. The third and final phase aims to formally establish a Trans-boundary Protected Area for Peace and Cooperation (Park for Peace). *Id.* ch. 3, at 4. This agreement would strengthen and provide political support to the institutions involved in regional collaboration and facilitate the evolution and adaptation of collaborative structures and approaches over time. *Id.* ch. 3, at 5. Such an agreement, however, is unnecessary for implementation of the World Heritage Species concept and is currently unlikely due to the political situation in the region.
[199] *Id.*
[200] *Id.*
[201] *Id.* ch. 3, at 8.

increases the amount of profit from tourism.[202] Additionally, regional tourism can increase the number of tourists and the length of their stays because each park has different attractions and the barriers to crossing the borders will be reduced.[203]

Funding is needed to support regional activities, which cost between $100,000 and $200,000 annually since 1991 for the IGCP.[204] Additionally, because of the political crisis in the DRC, which effectively split the protected management authority between the rebel-held eastern part of the country and the government-controlled central government, park staff in the DRC has not regularly received an official salary from the central government in more than five years, although they have received irregular payments from the local government.[205] It is also critical that funding be flexible and independent because of the potential for political tensions to paralyze funding from the central government.[206] A World Heritage Species listing can provide an independent funding base, depending upon the particular international agreements involved.

In addition to financial resources, conservation efforts need to be coordinated at a high level to prevent duplication of efforts and institutionalized to prevent against problems created by changes in staff, policy, or funding. Formalized alliances between park authorities and partner organizations based on clear memoranda of understanding (MOU) should be developed so that each partner has specified niches, with specialized roles and mandates.[207] Clearly identifying the relationships among various partners strengthens the effectiveness of conservation programs by preventing territoriality and competition for limited funds.[208] Additionally, informal mechanisms and agreements need to be institutionalized for the effects of regional collaboration to be sustainable.[209] For example, certain achievements of IGCP's regional program were lost at one point because of changes in protected area staff, and the program had to be reinitiated.[210]

An Agreement or Memorandum of Understanding (MOU) between Uganda and the DRC under Article IV of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) can benefit Bwindi gorillas by formalizing current field-based collaborations. CMS encourages the development of legally binding agreements or non-binding MOUs between range states of migratory species that have "a conservation status which would significantly benefit from the international cooperation that could be achieved by an international agreement."[211] Appendix I already lists mountain gorillas as a protected species,[212] but a species can be listed on Appendix II as well, if warranted.[213] Additionally, agreements can be made for populations of species, such as Bwindi gorillas, or the species as a whole.[214] Ideally, an agreement would cover all mountain gorillas, including Bwindi, and involve all three range states, Uganda, the DRC, and

[202] *Id.* ch. 3, at 10–11.
[203] *Id.* ch. 3, at 10.
[204] *Id.* ch. 3, at 14.
[205] *Id.* ch. 4, at 8.
[206] *Id.* ch. 4, at 12.
[207] *Id.* ch. 4, at 13; MUTEBI, *supra* note 101, at 8.
[208] LANJOUW ET AL., *supra* note 83, ch. 4, at 13–14.
[209] *Id.* ch. 5, at 3.
[210] *Id.*
[211] CMS, *supra* note 93, art. IV.1.
[212] *Id.* Appendix I.
[213] *Id.* art. IV.2.
[214] *Id.* art. IV.4.

Rwanda. Although Rwanda is not a party to CMS, the Convention encourages agreements between all range states, regardless of whether the country is a party.[215]

The main advantage of an agreement under CMS is the ability of range states to customize requirements to the needs of the region and the species. These agreements can be legally binding or informal endeavors, providing flexibility for politically tense regions like the DRC, Rwanda, and Uganda. On the other hand, each agreement requires a new secretariat and institutional framework, which could add extra cost and delay. Having a formalized institution, however, could provide the overarching strategy and high-level decision-making needed to prevent duplicate conservation efforts. According to GRASP, CMS is already beginning to focus on the eastern species of gorilla, which includes mountain and Bwindi gorillas, although the extent of their involvement to this point is unclear.[216]

Agreements should 1) identify the migratory species covered, 2) describe the range and migration route of the migratory species, 3) provide for each party to designate its national authority concerned with the implementation of the agreement, 4) establish, if necessary, appropriate machinery to assist in carrying out the aims of the agreement, to monitor its effectiveness, and to prepare reports for the Conference of the Parties, and 5) provide for procedures for the settlement of disputes between parties to the Agreement.[217] Agreements should also provide for, where feasible and appropriate, exchanges of information, coordinated management and conservation plans, habitat restoration, reduction in barriers to migration, or other measures necessary to conserve the species.[218] Other than political tension, there is no substantial barrier to formalized cooperation between mountain gorilla range states as the protected area authorities and NGOs have already laid the groundwork for an agreement. GRASP also recommends cooperative effort between range states through the implementation of trans-boundary natural resource management conservation agreements, such as an accord under CMS Article IV, in its Global Strategy.[219]

C. World Heritage Convention: List of World Heritage in Danger

BINP was established as a World Heritage Site in 1994[220] under the Convention Concerning the Protection of the World Cultural and Natural Heritage (WHC).[221] Parties with World Heritage sites must create a management plan for the site, set up reporting systems on the conservation status of the site, and designate a body charged with protecting and conserving the site.[222] Additionally, parties must take appropriate legal, scientific, and technical measures to protect and conserve the site, including public awareness training on the site's value.[223] Uganda, Rwanda, and DRC are parties the WHC.[224]

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[215] *Id.* art. V.2.
[216] GLOBAL STRATEGY § 24.
[217] CMS, *supra* note 93, art. V.4.
[218] *Id.* art. V.5.
[219] GLOBAL STRATEGY §§ 24, 38(m)(i).
[220] *Bwindi Impenetrable National Park*, *at* http://whc.unesco.org/pg.cfm?cid=31&id_site=682.
[221] World Heritage Convention, *supra* note 122.
[222] *Id.* at art. V.
[223] *Id.*
[224] World Heritage Convention, *States Parties*, *at* http://whc.unesco.org/pg.cfm?cid=246.

Although BINP is relatively well protected, the potential exists for political unrest, a damaging fire or other natural disaster, or unchecked tourism to damage the park's ecosystem and the survival of Bwindi gorillas. The Convention Concerning the Protection of the World Cultural and Natural Heritage (WHC) addresses the possibility of deterioration in the conservation status of World Heritage sites with a World Heritage in Danger listing.[225] This listing provides immediate funding, international attention, and expertise to a site in times of crisis.[226] In some cases, the mere prospect of inscribing a site on this List proves effective and may incite rapid conservation action.[227]

The Convention established the World Heritage Fund,[228] which can provide assistance to all World Heritage sites with studies; experts, technicians, and skilled labor; staff training in site rehabilitation; equipment; loans; and in exceptional cases, non-repayable grants.[229] The List of World Heritage in Danger contains sites "threatened by serious and specific dangers" for which "major operations" are necessary to conserve the site and a party has requested assistance.[230] For example, the five World Heritage sites in the DRC have all been inscribed on this list, resulting in a $2.9 million project to assist conservation of these areas.[231] Since the initiation of the project, the European Union, the World Bank, and other donors have shown interest, and the Government of Belgium contributed 300,000 Euros.[232]

One potential drawback of a World Heritage in Danger listing is that a property can be deleted from both the List of World Heritage in Danger and the World Heritage List if it loses the characteristics that initially qualified the site for the World Heritage List.[233] This provision, however, has never been applied.[234] This history of non-removal suggests the List of World Heritage in Danger can provide a useful tool during times of crisis at BINP.

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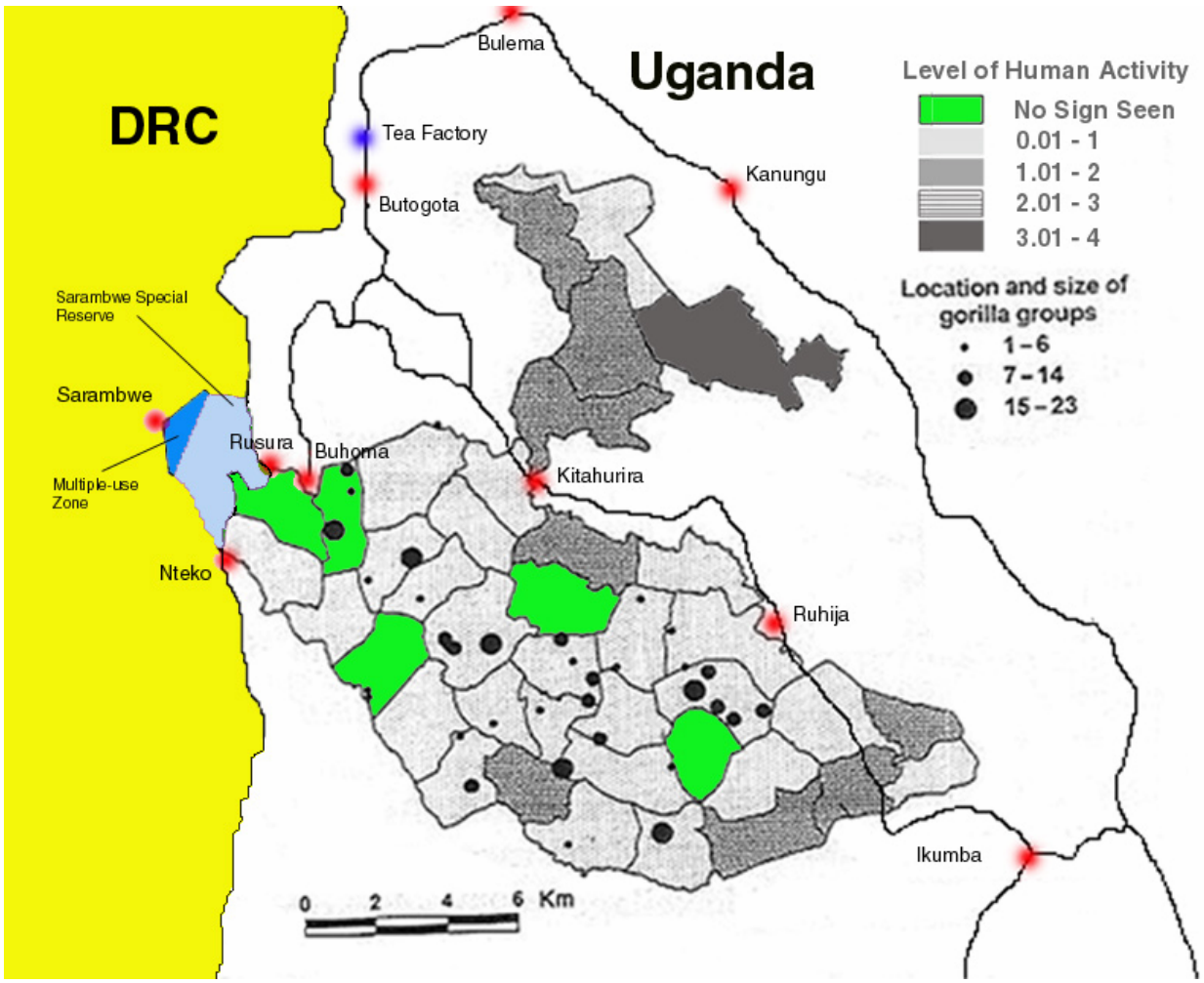
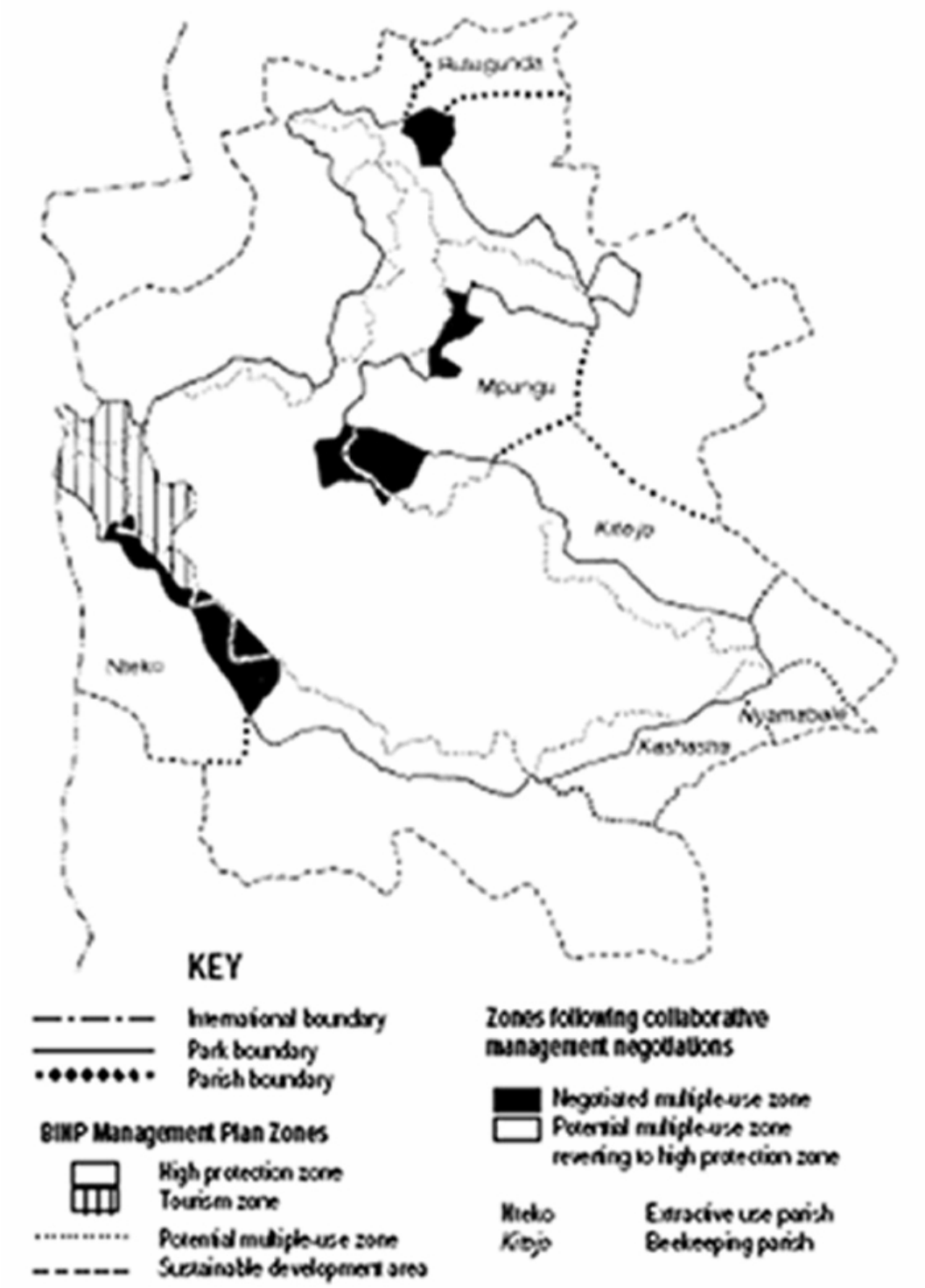
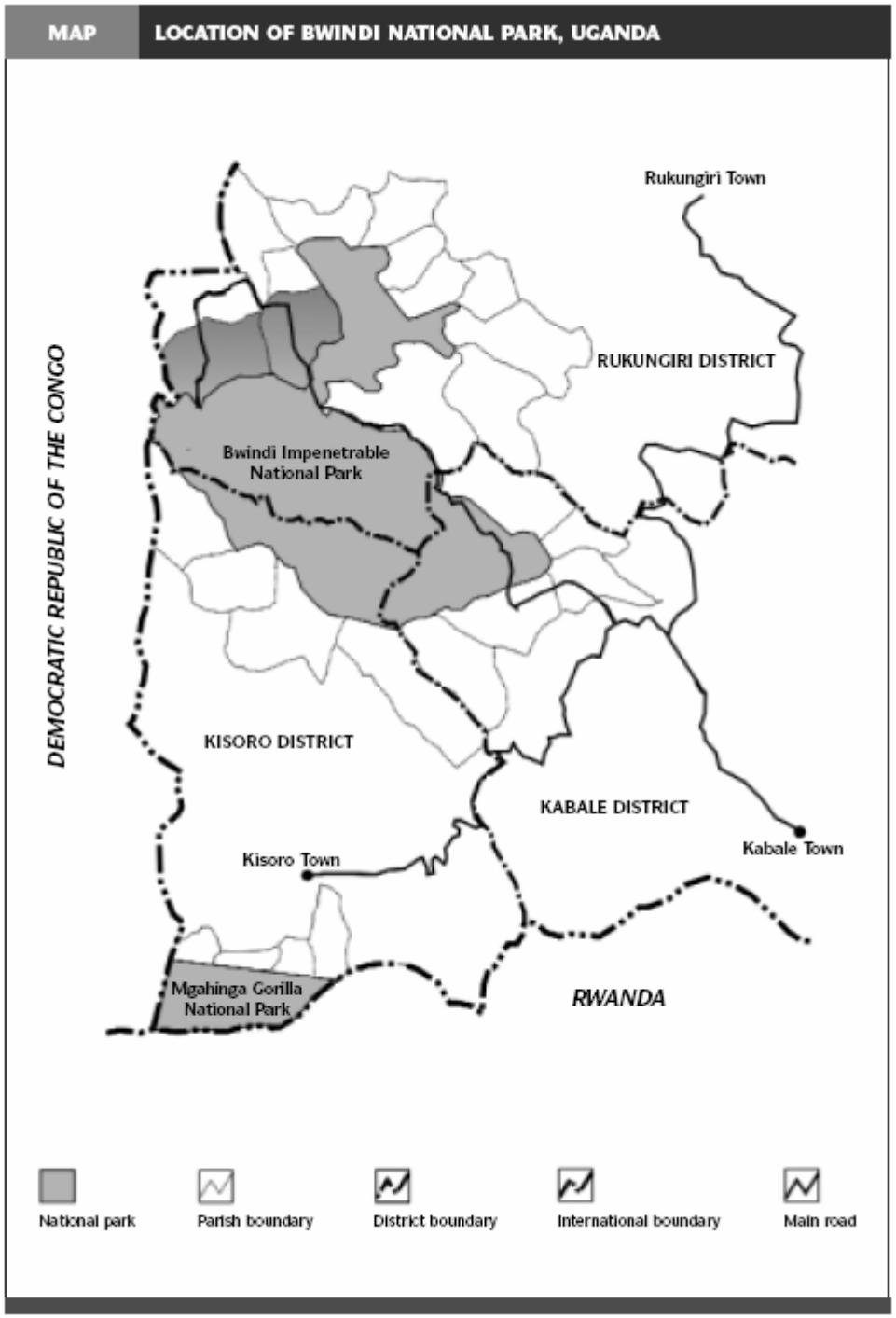
[225] World Heritage Convention, *supra* note 122, art. 11.4; World Heritage Convention, *World Heritage in Danger, at* http://whc.unesco.org/pg.cfm?cid=158.
[226] World Heritage Convention, *World Heritage in Danger, at* http://whc.unesco.org/pg.cfm?cid=158. The U.N. Foundation contributed $1.5 million to help pilot a Rapid Response Facility that can deploy timely funding and technical assistance to World Heritage sites that are either facing emergency needs or are placed on the List of World Heritage in Danger. Prior to this program, there was no flexible funding mechanism capable of providing emergency assistance in a timely fashion. United Nations Foundation, *Biodiversity Grants, at* http://www.unfoundation.org/programs/environment/grants.asp.
[227] World Heritage Convention, *World Heritage in Danger, at* http://whc.unesco.org/pg.cfm?cid=158.
[228] World Heritage Convention , *supra* note 122, art. 15.
[229] *Id.* art. 22.
[230] *Id.* art. 11.4. For a summary of the process of inscribing sites on the List of World Heritage in Danger, see IUCN–WCPA, *World Heritage Monitoring, at* http://www.iucn.org/themes/wcpa/wheritage/monitoring/monitoring.htm#danger.
[231] WHC, *Biodiversity Conservation in Regions of Armed Conflict: Protecting World Heritage in the Democratic Republic of the Congo, at* http://whc.unesco.org/pg.cfm?cid=39&id_project=29.
[232] *Id.*
[233] WHC, *World Heritage in Danger, at* http://whc.unesco.org/pg.cfm?cid=158.
[234] *Id.*

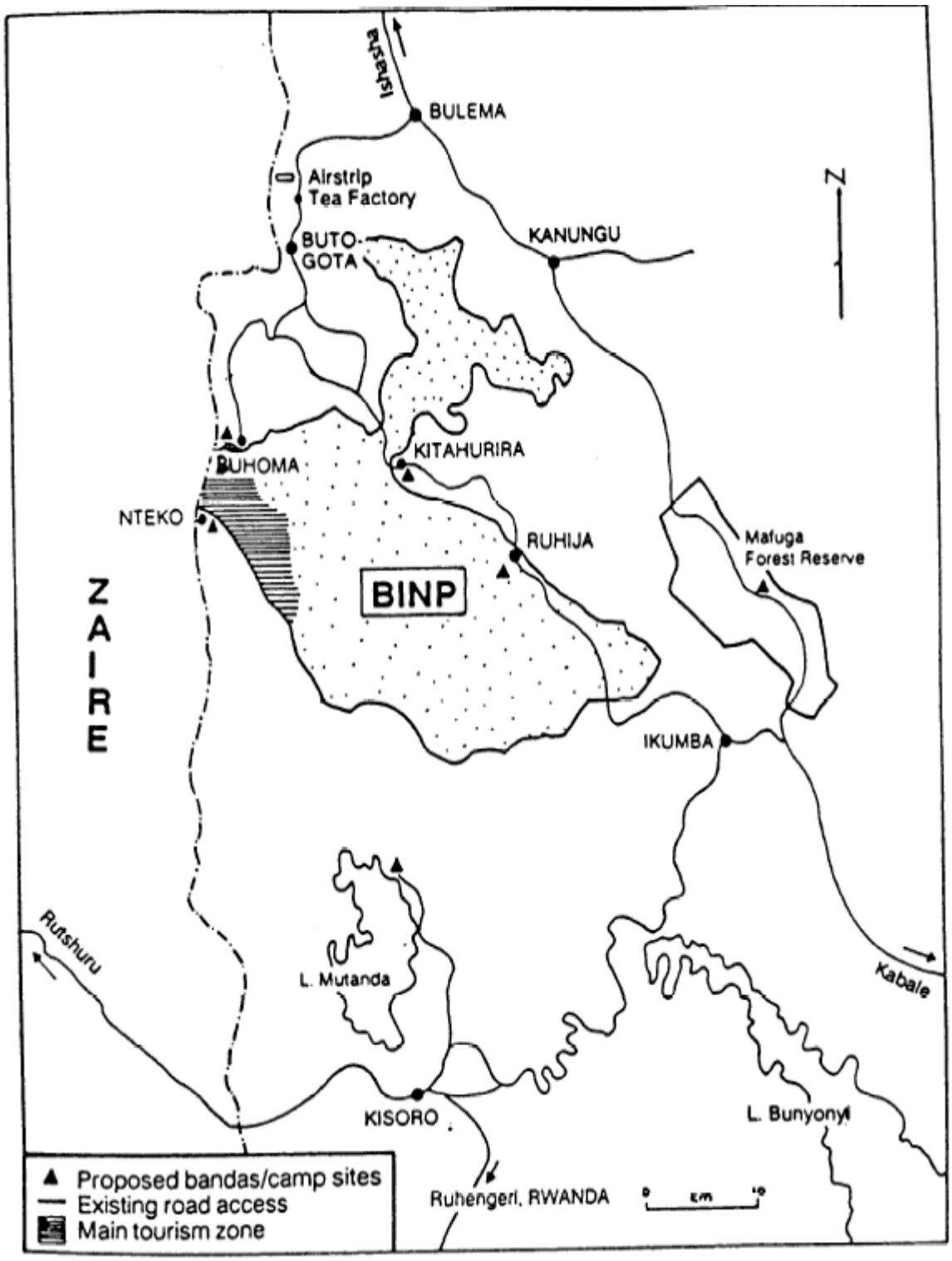

DRC
Uganda
Bulema
Tea Factory
Butogota
Kanungu
Sarambwe Special Reserve
Sarambwe
Rusura
Buhoma
Multiple-use Zone
Nteko
Kitahurira
Ruhija
Ikumba
0 2 4 6 Km
Level of Human Activity
No Sign Seen
0.01 - 1
1.01 - 2
2.01 - 3
3.01 - 4
Location and size of gorilla groups
1 - 6
7 - 14
15 - 23



ROBERT G. WILD & JACKSON MUTEBI, CONSERVATION THROUGH COMMUNITY USE OF PLANT RESOURCES: ESTABLISHING COLLABORATIVE MANAGEMENT AT BWINDI IMPENETRABLE AND MGAHINGA GORILLA NATIONAL PARKS, UGANDA 15 (UNESCO 1996), *at* http://peopleandplants.org/web-content%201/pdf/wp5e.pdf.



Tom Blomley, *Natural Resource Conflict Management: The Case of Bwindi Impenetrable and Mgahinga Gorilla National Parks, South Western Uganda, in* NATURAL RESOURCE CONFLICT MANAGEMENT CASE STUDIES: AN ANALYSIS OF POWER, PARTICIPATION AND PROTECTED AREAS 231, 235 (A. Peter Castro & Erik Nielsen eds. 2003), *at* ftp://ftp.fao.org/docrep/fao/005/y4503e/y4503e11.pdf.



IUCN & World Conservation Monitoring Centre, WORLD HERITAGE NOMINATION: BWINDI IMPENETRABLE NATIONAL PARK, UGANDA 53 (March 1994).

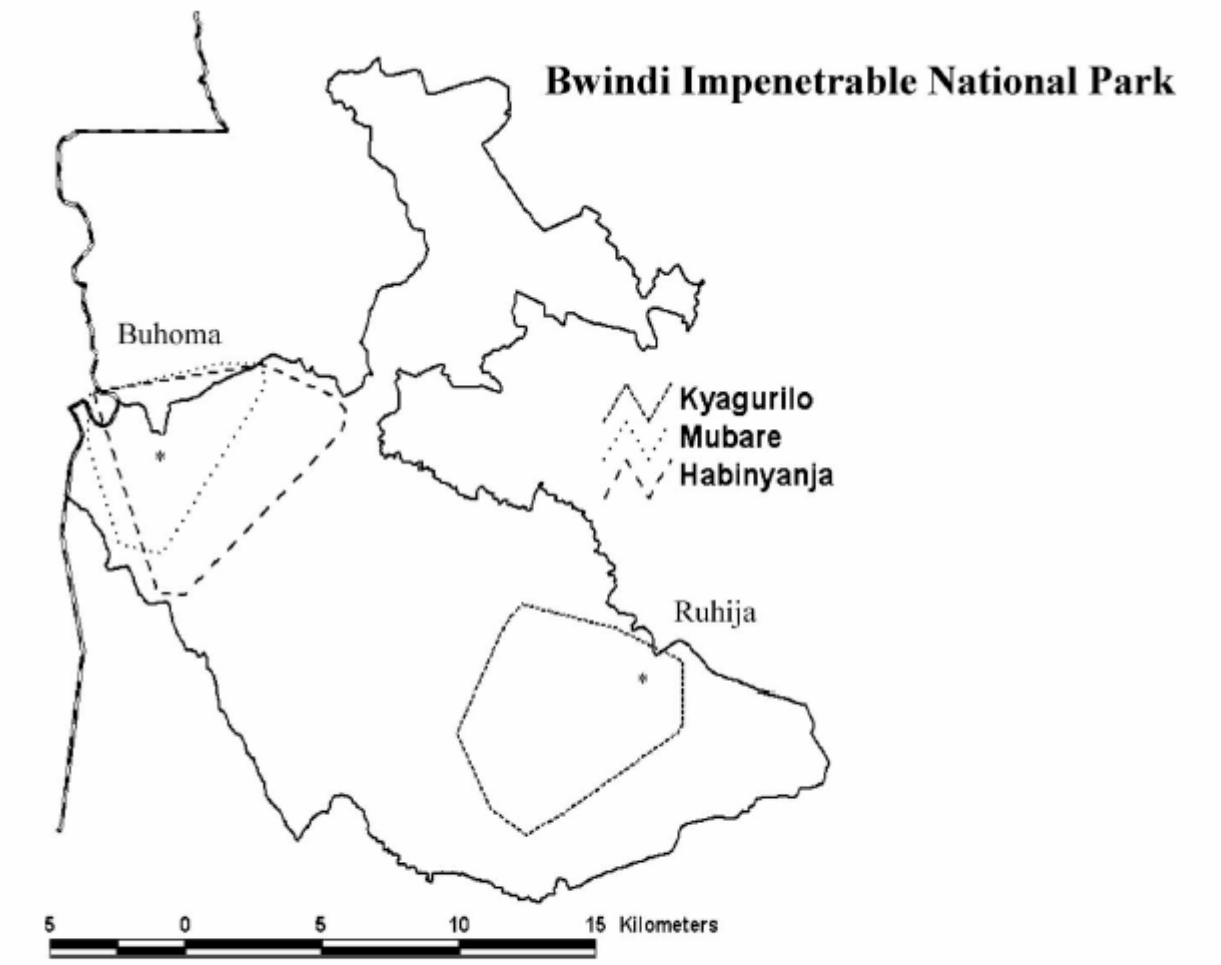


Fig. 1b. Map of Bwindi Impenetrable National Park, Uganda and the 2 study sites, Buhoma (1450–1800 m) and Ruhija (2100–2500 m). The home range size of each group was calculated using the minimum convex polygon method.

Jessica Ganas et al., *Dietary Variability of Mountain Gorillas in Bwindi Impenetrable National Park, Uganda*, 25 INTERNATIONAL JOURNAL OF PRIMATOLOGY 1043, 1047 (October 2004).

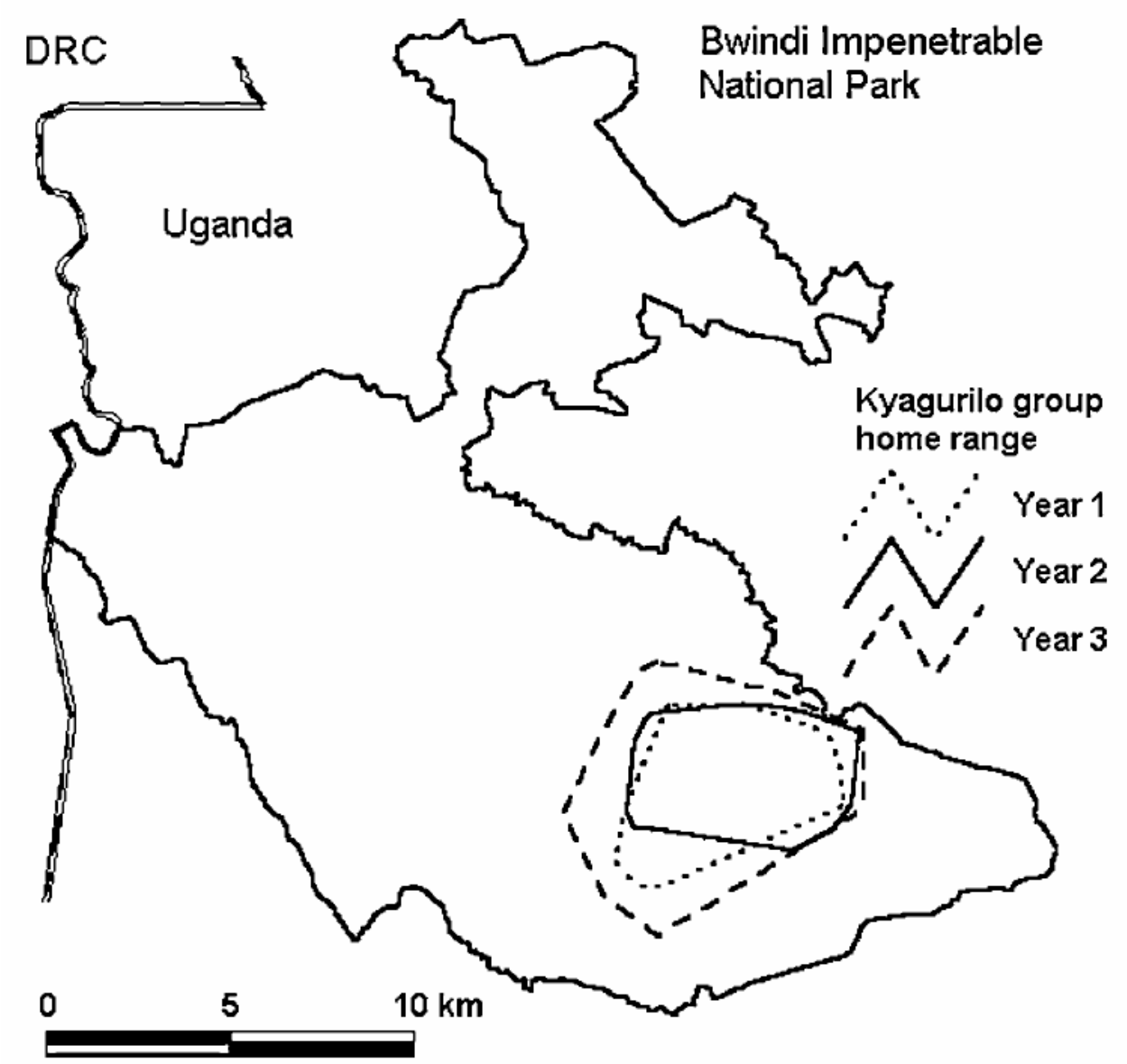
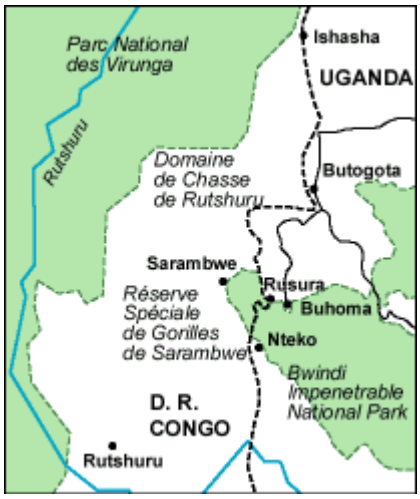


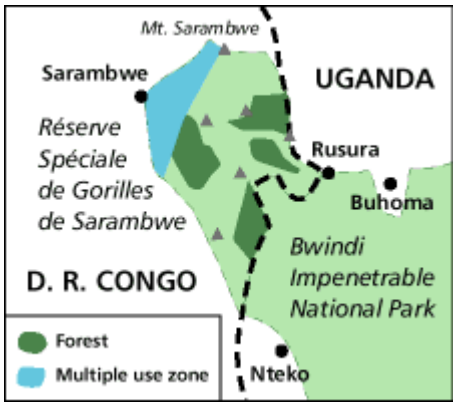
Fig. 3. Home range of Kyagurilo Group during three years.

Martha M. Robbins & Alastair McNeilage, *Home Range and Frugivory Patterns of Mountain Gorillas in Bwindi Impenetrable National Park, Uganda*, 24 INTERNATIONAL JOURNAL OF PRIMATOLOGY 467, 479 (2003).

Bwindi Impenetrable National Park, at http://www.berggorilla.de/english/frame.html.



Claude S. Kiyengo, *The Sarambwe Gorilla Special Reserve*, 27 GORILLA JOURNAL 10 (Dec. 2003), at http://www.berggorilla.de/english/gjournal/texte/27sarambwe.html.



Claude S. Kiyengo, *The Sarambwe Gorilla Special Reserve*, 27 GORILLA JOURNAL 10 (Dec. 2003), at http://www.berggorilla.de/english/gjournal/texte/27sarambwe.html.