



CHAPTER 1 Defining the Gulf of Guinea Forests

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CHAPTER 1

Defining the Gulf of Guinea Forests



Iladyi valley, southern
highlands, Bioko Island.

The area within the West African rain forest zone between the Niger and Sanaga rivers, including the continental-shelf island of Bioko (see map, p. 7), has been long recognized for high species richness and high endemism in many taxa. At the same time, parts of this region also have some of the highest human population densities in tropical Africa, and throughout the area human numbers continue to grow rapidly. Consequently, the region's remaining forests are becoming increasingly degraded and fragmented, and its large-animal populations are under intense pressure from hunting, particularly for the bushmeat trade.

The volcano Mount Cameroon, the highest mountain in West Africa at 4,095 m, sits within the region, part of a chain of highlands along a tectonic fault that extends northwest-southeast into the Gulf of Guinea through Bioko, Principe, São Tomé, Annobón, and on to St. Helena. The Cross River runs through the mainland portion of the region, while the delta of the River Niger—the largest river delta in tropical Africa—occupies the region's western edge. Important coastal swamplands lie east of the Niger Delta. From the southern shore of Bioko to the Nigerian town of Obudu, 380 km to the north, annual rainfall ranges from more than 10,000 mm (the highest in Africa) to around 1,800 mm, with a four-month dry season. The resultant ecological diversity, combined with high species richness, high endemism, and high threat, make this region a classic “biodiversity hotspot,” and therefore a high global priority for conservation. Indeed, the European Commission's Joint Research Centre TREES project classified a major section of this area (labeled “Korup-Cross River”) as one of 19 tropical humid forest deforestation hotspots in West and Central Africa (Achard *et al.* 1998).

Despite its exceptional characteristics, this region remains without a generally accepted name. It has been referred to as “Cameroon” (Oates 1986), “West-Cameroon” (Grubb 1990), and “Cameroon Highlands” (Sayer *et al.* 1992), but none of these names is entirely appropriate because a significant part of the region is in Nigeria, another part on the island of Bioko (a component of the Republic of Equatorial Guinea), and much of the area is lowland forest.

The geography of the area includes the coastal areas and islands of the Bight of Biafra, a name that appears in many atlases. Letouzey (1968) refers to the coastal forest area from southeastern Nigeria to the south of Cameroon as *la forêt biafriéne* (Biafran forest), and in an analysis of African centers of endemism, Kingdon (1990) uses the term Bight of Biafra for one of his centers. Kingdon does not precisely define this center's boundaries, but his reference map covers the area from the Bénin-Nigeria border in the west to the mouth of the Ogooué River in Gabon in the south. He notes that this area contains “one of the greatest concentrations of plant and animal life on the entire continent.” However, by treating the entire area under one broad rubric, Kingdon disregards the distinct zoogeographical communities within it, especially the major faunal disjunction which occurs in the region of the Sanaga River in Cameroon. The name “Biafra” also has unfortunate political connotations in Nigeria as it is associated with the secession of the Eastern Region in 1967 and the subsequent civil war.

Given the problems associated with the various alternative names described above and the lack of any other familiar term, in this report we use “Gulf of Guinea Forests” for this region. We recognize that this term is not ideal, for the geographical limits of the Gulf are usually considered to extend well to the west of this region as it is defined here. We use this term only on a provisional basis, in the absence of any obviously satisfactory alternative.

AN UNDERSTUDIED AREA

Although Eisentraut's classic study (1973) compares the vertebrate fauna of Bioko with that of West Cameroon, and although a recent quantitative analysis confirms the pattern of high species richness and high endemism for the primates of this region (Eeley & Lawes 1999), no unified investigation has yet been done of biodiversity patterns in the Gulf of Guinea forests as a whole. To be sure, the region's birds have been quite well studied, and its montane forests are recognized as an important area of bird species endemism (Jensen & Stuart 1984, Collar & Stuart 1988, Stattersfield *et al.* 1998). Lists of butterfly, amphibian, reptile, and plant species have also been compiled for several sites in the region, but in most cases these have not been accompanied by analyses of the number and proportion of species that are narrowly or broadly endemic, or by an examination of how patterns of endemism compare with areas to the west and east.

This region has also been relatively neglected in international conservation planning. It was not given special attention in a continent-wide “ecoregional” assessment conducted by WWF-US in Cape Town in August 1998, nor was it included in Conservation International's Upper Guinea Rain Forest Priority-setting Workshop, held in Ghana in December 1999. The region has also been excluded from a variety of special conservation activities targeted at the Congo Basin.

For a variety of reasons, the Gulf of Guinea forest region lacks an integrated approach to its conservation problems. Creating an integrated plan is difficult not only because of problems posed by the long border between Nigeria and Cameroon (a border which passes directly through some of the largest remaining areas of natural forest), but also by the political isolation of Nigeria under its recent military regimes (and associated lack of foreign aid funds), and the Equatorial Guinean government's apparent wariness of foreign scientists and organizations. Although Nigeria, Cameroon, and Equatorial Guinea have each designated or proposed protected areas within the Gulf of Guinea forest region, the extent to which these areas provide adequate protection for the region's biodiversity has not been carefully examined.

In this volume, we give particular attention to the primates of the Gulf of Guinea forests because they are relatively well known and of special interest to the authors, and because this region is clearly a world hotspot for this group. Between the Niger and Sanaga Rivers, including Bioko Island, 22 primate species have been recorded, with some forests in the region supporting up to 14 sympatric species. At least six of the region's primate species are endemics, as are most of the region's primate subspecies, particularly those on Bioko. Furthermore, because these primates occur in a relatively small area, and because the pressures from hunting and habitat destruction are great, the region contains a high concentration of endangered and critically endangered taxa. Chapter 4 provides more extended discussion of these primates and their distribution.

This study was carried out to address the need for more information regarding the Gulf of Guinea forests, to more fully document their biological importance, and to promote a unified treatment of the forests' biodiversity and conservation needs. To accomplish these goals, we

- documented and mapped existing information on biogeographic patterns in the Gulf of Guinea forests,
- compared these patterns to those of neighboring regions, paying particular attention to the status of several rare and endemic primates,
- investigated the extent to which existing conservation activities provide adequate protection to the region's biodiversity, and
- identified gaps in existing knowledge and conservation activities and developed recommendations for actions needed to be taken to fill these gaps.

REFERENCES CITED

- Achard, F., Eva, H., Glinni A., Mayaux P., Richards, T., & Stibig, H.J. 1998. *Identification of Deforestation Hot Spot Areas in the Humid Tropics*. Ispra, Italy: Joint Research Centre, European Commission.
- Aldrich, M., Bubbs, P., Hostettler, S., & van de Wiel, H. 2000. *Tropical Montane Cloud Forests: Time for Action*. Gland and Cambridge: WWF-IUCN-UNEP.
- Amiet, J.-L. 1971. *Leptodactylon* nouveaux du Cameroun (Amphibiens Anoures). *Ann. de la Fac. des Sciences du Cameroun* 7–8: 141–172.
- Amiet, J.-L. 1972a. Description de cinq nouvelles espèces camerounaises de *Cardioglossa* (Amphibiens Anoures). *Biologica Gabonica* 8: 201–231.
- Amiet, J.-L. 1972b. Description de trois Bufonidés orophiles du Cameroun appartenant au groupe de *Bufo preussi* Matschie (Amphibiens Anoures). *Ann. de la Fac. des Sciences du Cameroun* 11: 21–140.
- Amiet, J.-L. 1977. Les *Astylosternus* du Cameroun (Amphibia, Anura, Astylosterninae). *Ann. de la Fac. des Sciences du Cameroun* 23–24: 99–227.
- Amiet, J.-L. 1978. Les amphibiens anoures de la région de Mamfé (Cameroun). *Ann. de la Fac. des Sciences du Cameroun* 25: 189–219.
- Amiet, J.-L. 1981. Une nouvelle *Cardioglossa* orophile de la dorsale camerounaise: *C. schioetzi* nov. sp. (Amphibia, Anura, Arthroleptinae). *Ann. de la Fac. des Sciences du Cameroun* 28: 117–131.
- Amiet, J.-L. 1983. Une espèce méconnue de *Petrodetes* du Cameroun: *Petrodetes parkeri* n. sp. (Amphibia Anura: Ranidae, Phrynobatrachinae). *Revue suisse de Zoologie* 90: 457–468.
- Ayeni, J.S.O. & Mdaihl, M. 2001. The Cameroon-German (MINEF-GTZ) project for protection of forests around Akwaya (PROFA), South West Province, Cameroon. In A.E. Bassey & J.F. Oates (eds.), *Proceedings of the International Workshop and Conference on the Conservation of the Cross River Gorillas*. Calabar, Nigeria: NCF and WCS.
- Booth, A.H. 1958. The zoogeography of West African primates: A review. *Bulletin de l'I.F.A.N.* 20, sér. A: 587–622.
- Brooks, T., Balmford, A., Burgess, N., Fjeldsa, J., Hansen, L.A., Moore, J., Rahbek, C., & Williams, P. 2001. Toward a blueprint for conservation in Africa. *BioScience* 51: 613–624.
- Butynski, T.M. & Koster, S.H. 1989. Marine turtles on Bioko Island (Fernando Poo), Equatorial Guinea: A call for research and conservation. Washington, DC: WWF.
- Butynski, T.M. & Koster, S.H. 1990. The status and conservation of forests and primates on Bioko Island (Fernando Poo), Equatorial Guinea. Washington, DC: WWF.
- Butynski, T.M. & Koster, S.H. 1994. Distribution and conservation status of primates in Bioko island, Equatorial Guinea. *Biodiversity and Conservation* 3: 893–909.
- Cable, S. & Cheek, M. 1998. *The Plants of Mount Cameroon: A Conservation Checklist*. Kew: Royal Botanic Gardens.
- Caldecott, J.O., Bennett, J.G., & Ruitenbeek, H.J. 1989. *Cross River National Park (Oban Division): Plan for Developing the Park and Its Support Zone*. Godalming, Surrey: WWF-UK.
- Caldecott, J.O., Oates, J.F., & Ruitenbeek, H.J. 1990. *Cross River National Park (Okwangwo Division): Plan for Developing the Park and Its Support Zone*. Godalming, Surrey: WWF-UK.
- Castelo, R. 1994. Biogeographical considerations of fish diversity in Bioko. *Biodiversity and Conservation* 3: 808–827.
- Castroviejo, J., Javier Juste, B., Castelo, R., & Pérez del Val, J. 1994. The Spanish co-operation programme in Equatorial Guinea: A ten-year review of research and nature conservation in Bioko. *Biodiversity and Conservation* 3: 951–961.
- Central Intelligence Agency. 2003. *The World Factbook 2003*. Online. Available: <http://www.cia.gov/cia/publications/factbook>.
- Cheek, M., Mackinder, B., Gosline, G., Onana, J.-M., & Achoundong, G. 2000. The phytogeography and flora of western Cameroon and the Cross River-Sanaga River interval. In E. Robbrecht, J. Degreef, & I. Friis (eds.), *Plant Systematics and Phytogeography for the Understanding of African Biodiversity*. Proceedings of the XVIth AEFTAT Congress, National Botanic Garden of Belgium.
- Collar, N.J. & Stuart, S.N. 1988. *Key Forests for Threatened Birds in Africa*. Cambridge: ICBP.
- Collins, S.C. & Larsen, T.B. 2000. Eight new species and five new subspecies of African butterflies (Rhopalocera) – an ABRI research paper. *Metamorphosis* 11: 57–70.
- deMenocal, P.B. 1995. Plio-Pleistocene African climate. *Science* 270: 53–59.
- Dieterlen, F. & Van der Straeten, E. 1992. Species of the genus *Otomys* from Cameroon and Nigeria and their relationship to East African forms. *Bonn. Zool. Beitr.* 43: 383–392.
- Dowsett, R. J. & Forbes-Watson, A.D. 1993. *Checklist of birds of the Afrotropical and Malagasy regions. Volume 1: Species limits and distribution*. Liege, Belgium: Tauraco Press.
- Ebin, C.O. 1983. An appraisal of the biotic and material resources of some game reserves and wildlife management in Nigeria. Lagos: Report to the Nigerian Conservation Foundation.
- Eeley, H.A.C. & Lawes, M.J. 1999. Large-scale patterns of species richness and species range size in anthropoid primates. In J.G. Fleagle, C. Janson, & K.E. Reed (eds.), *Primate Communities*. pp. 191–219. Cambridge: Cambridge University Press.
- Eisentraut, M. 1973. Die Wirbeltierfauna von Fernando Poo und Westkamerun. *Bonner Zoologische Monographien*, No. 3: 1–428.
- Elgood, J.H., Heigham, J.B., Moore, A.M., Nason, A.M., Sharland, R.E., & Skinner, N.J. 1994. *The Birds of Nigeria: An Annotated Check-List*. 2nd Ed. Tring, UK: British Ornithologists' Union.

- Fa, J.E. & Castroviejo, J. 1992. Equatorial Guinea. In J.A. Sayer, C.S. Harcourt, & N.M. Collins (eds.), *The Conservation Atlas of Tropical Forests: Africa*. pp. 161–167. London: Macmillan.
- Fa, J.E., Juste, J., Pérez del Val, J., & Castroviejo, J. 1995. Impact of market hunting on mammal species in Equatorial Guinea. *Conservation Biology* 9: 1107–1115.
- Fa, J.E., Yuste, J.E.C., & Castelo, R. 2000. Bushmeat markets on Bioko Island as a measure of hunting pressure. *Conservation Biology* 14: 1602–1613.
- Figueiredo, E. 1994. Diversity and endemism of angiosperms in the Gulf of Guinea islands. *Biodiversity and Conservation* 3: 785–793.
- Fraser, P.J. Hall, J.B., & Healey, J.R. 1998. *Climate of the Mount Cameroon Region; Long and Medium Term Rainfall, Temperature and Sunshine Data*. University of Wales, Bangor, School of Agricultural and Forest Sciences Publication No. 16. 56 pp.
- Gadsby, E.L. 1989. *Cross River Basin Primate Survey: Stubbs Creek Forest Reserve*. Calabar: Unpublished report, 10 pp.
- Gartlan, J.S., Newbery, D.McC., Thomas, D.W., & Waterman, P.G. 1986. The influence of topography and soil phosphorus on the vegetation of Korup Forest Reserve, Cameroon. *Vegetatio* 65: 131–148.
- Gartshore, M.E. 1984. The status of the montane herpetofauna of the Cameroon highlands. In S.N. Stuart (ed.), *Conservation of Cameroon Montane Forests*. pp. 204–240. Cambridge: International Council for Bird Preservation.
- Gautier-Hion, A., Colyn, M., & Gautier J.-P. 1999. *Histoire naturelle des Primates d'Afrique Centrale*. Libreville, Gabon: ECOFAC.
- Green, A.A. & Rodewald, P.G. 1996. New bird records from Korup National Park and environs, Cameroon. *Malimbus* 18: 122–133.
- Grubb, P. 1990. Primate geography in the Afro-tropical forest biome. In G. Peters & R. Hutterer (eds.), *Vertebrates in the Tropics*. pp. 187–214. Bonn: Museum Alexander Koenig.
- Hall, J.B. 1981. Ecological islands in south-eastern Nigeria. *African Journal of Ecology* 19: 55–72.
- Hamilton, A.C. 1982. *Environmental History of East Africa: A Study of the Quaternary*. London: Academic Press.
- Harcourt, A.H., Stewart, K.J., & Inaharo, I.M. 1989. Gorilla quest in Nigeria. *Oryx* 23: 7–13.
- Hart, T.B., Hart, J.A., & Murphy, P.G. 1989. Monodominant and species-rich forests of the humid tropics: Causes for their co-occurrence. *American Naturalist* 133: 613–633.
- Hearn, G.W. & Morra, W. 2000. *Annual report (July 1999–June 2000) on Beaver College's Bioko Biodiversity Protection Program*. Glenside, PA: Beaver College Biology Department.
- Hilton-Taylor, C. 2000. *2000 IUCN Red List of Threatened Species*. Gland: IUCN.
- Hofer, U., Bersier, L.-F., & Borcard, D. 1999. Spatial organization of a herpetofauna on an elevational gradient revealed by null model tests. *Ecology* 80: 976–988.
- Holland, M.D., Allen, R.K.G., Barton, D., & Murphy, S.T. 1989. *Cross River National Park, Oban Division: Land Evaluation and Agricultural Recommendations*. Chatham, Kent: ODNRI.
- Hugueny, B. & Lévêque, C. 1994. Freshwater fish zoogeography in west Africa: Faunal similarities between river basins. *Environmental Biology of Fishes* 39: 365–380.
- Hutchinson, J., Dalziel, J.M., & Keay, R.W.J. 1954. *Flora of West Tropical Africa*. Vol. 1, Part 1. London: Crown Agents.
- Hutchinson, J., Dalziel, J.M., & Keay, R.W.J. 1958. *Flora of West Tropical Africa*. Vol. 1, Part 2. London: Crown Agents.
- Hutterer, R., Dieterlen, F., & Nikolaus, G. 1992. Small mammals from forest islands of eastern Nigeria and adjacent Cameroon, with systematical and biogeographical notes. *Bonn. Zool. Beitr.* 43: 393–414.
- Hutterer, R. & Schlitter, D.A. 1996. Shrews of Korup National Park, Cameroon, with the description of a new *Sylvisorex* (Mammalia: Soricidae). In *Contributions in Mammalogy: A Memorial Volume Honoring Dr. J. Knox Jones, Jr.* pp. 57–66. Museum of Texas Tech University.
- Iremonger, S., Ravilious, C., & Quinton, T. (eds.). 1997. *A Global Overview of Forest Conservation*. CD-ROM. Cambridge: WCMC & CIFOR.
- IUCN. 2002. *2002 IUCN Red List of Threatened Species*. Online. Available: <http://www.redlist.org>. 14 August 2002.
- Jensen, F.P. & Stuart, S.N. 1984. The origin and evolution of the Cameroon montane forest avifauna. In S.N. Stuart (ed.), *Conservation of Cameroon Montane Forests*. pp. 28–37. Cambridge: International Council for Bird Preservation.
- Juste, J.B. & Fa, J.E. 1994. Biodiversity conservation in the Gulf of Guinea islands: Taking stock and preparing action. *Biodiversity and Conservation* 3: 759–771.
- Keay, R.W.J., Onochie, C.F.A., & Stanfield, D.P. 1964. *Nigerian Trees*, 2 vols. Ibadan, Nigeria: Federal Department of Forest Research.
- King, S. 1994. Utilisation of wildlife in Bakossiland, West Cameroon. *Traffic Bulletin* 14: 63–73.
- Kingdon, J. 1990. *Island Africa: The Evolution of Africa's Rare Animals and Plants*. London: Collins.
- Larsen, T.B. 1995a. *Butterfly Research in the Oban Hills, Cross River National Park*. Calabar: Oban Hills Programme, Second Interim Report.
- Larsen, T.B. 1995b. *A Provisional Annotated List of the Butterflies of the Obudu Plateau*. Obudu: WWF-CRNP Okwangwo Programme.
- Larsen, T.B. 1997a. Butterflies of the Cross River National Park – diversity writ large. Proceedings of workshop on *Essential Partnership – The Forest and the People*, Cross River National Park, Calabar, Nigeria. pp. 229–235.
- Larsen, T.B. 1997b. An annotated list of the butterflies known from the Obudu Plateau (eastern Nigeria). Proceedings of workshop on *Essential Partnership – The Forest and the People*, Cross River National Park, Calabar, Nigeria. pp. 213–228.
- Larsen, T.B. 1997c. *Korup Butterflies – Diversity Writ Large*. Report on a butterfly study mission to Korup National Park in Cameroon during January and February of 1997. Report to WWF-UK and Korup National Park.
- Lawson, D.P. 1993. The reptiles and amphibians of the Korup National Park Project, Cameroon. *Herpetological Natural History* 1: 27–90.
- Letouzey, R. 1968. Notes phytogéographique du Cameroun. *Encyclopédie Biologique* 49, 508. Paris: P. Lechevalier.
- Litt, A. & Cheek, M. 2002. *Korupodendron songweanum*, a new genus and species of Vochysiaceae from West-Central Africa. *Brittonia* 54: 13–17.

- Louette, M. 1981. The birds of Cameroon: An annotated check-list. *Verhandl. Kon. Acad. Wetensch. Lett. Schone Kunst. Belg.* 43: 1–218.
- Maisels, F.G., Cheek, M., & Wild, C. 2000. Rare plants on Mount Oku summit, Cameroon. *Oryx* 34: 136–140.
- Maisels, F.G., Keming, E., Kemei, M., & Toh, C. 2001. The extirpation of large mammals and implications for montane forest conservation: The case of the Kilum-Ijim Forest, North-west Province, Cameroon. *Oryx* 35: 322–331.
- Maley, J. 1996. The African rain forest – main characteristics of changes in vegetation and climate from the Upper Cretaceous to the Quaternary. *Proceedings of the Royal Society of Edinburgh* 104B: 31–73.
- Maley, J. 2002. A catastrophic destruction of African forests about 2,500 years ago still exerts a major influence on present vegetation formations. In M. Leach, J. Fairhead, & K. Amanor (eds.), *Science and the Policy Process: Perspectives from the Forest*. pp. 13–30. IDS Bulletin, Vol. 33, No. 1.
- Maley, J. & Brenac, P. 1998. Vegetation dynamics, palaeoenvironments and climatic changes in the forests of western Cameroon during the last 28,000 years. *Review of Palaeobotany and Palynology* 99: 157–187.
- Maley, J., Livingstone, D.A., Giresse, P., Thouveny, N., Brenac, P., Kelts, K., Kling, G., Stager, C., Haag, M., Fournier, M., Bandet, Y., Williamson, D., & Zogning, A. 1990. Lithostratigraphy, volcanism, paleomagnetism and palynology of Quaternary lacustrine deposits from Barombi Mbo (West Cameroon): Preliminary results. *Journal of Volcanology and Geothermal Research* 42: 319–335.
- Moreau, R.E. 1966. *The Bird Faunas of Africa and Its Islands*. London: Academic Press.
- Newbery, D.McC. & Gartlan, J.S. 1996. A structural analysis of rain forest at Korup and Douala-Edea, Cameroon. *Proceedings of the Royal Society of Edinburgh* 104B: 177–224.
- Ngandjui, G. & Blanc, P.C. 2000. Biogeographie et biodiversité: Aires protégée et conservation des mammifères au Cameroun. *Biogeographica* 76: 63–77.
- Nichol, J.E. 1999. Geomorphological evidence and Pleistocene refugia in Africa. *Geographical Journal* 165: 79–89.
- Oates, J.F. 1986. *Action Plan for African Primate Conservation: 1986–90*. Stony Brook, NY: IUCN/SSC Primate Specialist Group.
- Oates, J.F. 1988. The distribution of *Cercopithecus* monkeys in West African forests. In A. Gautier-Hion, F. Bourlière, J.-P. Gautier, & J. Kingdon (eds.), *A Primate Radiation: Evolutionary Biology of the African Guenons*. pp. 79–103. Cambridge: Cambridge University Press.
- Oates, J.F. 1996. *African Primates: Status Survey and Conservation Action Plan*. Revised edition. Gland: IUCN.
- Oates, J.F. 1999. *Myth and Reality in the Rain Forest: How Conservation Strategies are Failing in West Africa*. Berkeley: University of California Press.
- Oates, J.F., McFarland, K.L., Groves, J.L., Bergl, R.A., Linder, J.M., & Disotell, T.R. 2003. The Cross River gorilla: Natural history and status of a neglected and critically endangered subspecies. In A.B. Taylor & M.L. Goldsmith (eds.), *Gorilla Biology: A Multi-disciplinary Perspective*. pp. 472–497. Cambridge: Cambridge University Press.
- Oates, J.F., White, D., Gadsby, E.L., & Bisong, P.O. 1990. Conservation of gorillas and other species. Appendix 1 to *Cross River National Park (Okwangwo Division): Plan for Developing the Park and Its Support Zone*. Godalming, Surrey: World Wide Fund for Nature, United Kingdom.
- Obot, E. 2000. Saving the green gold: Nigerian Conservation Foundation in Cross River National Park, Okwangwo Division. *Naturewatch* (NCF, Lagos) January 2000: 28–29.
- Parker, H.W. 1936. The amphibians of the Mamfe Division, Cameroons – I. Zoogeography and systematics. *Proceedings of the Zoological Society of London* (1936): 135–163.
- Pérez del Val, J. 1996. *Las Aves de Bioko, Guinea Ecuatorial: Guía de Campo*. León, Spain: Edilsa.
- Pérez del Val, J., Fa, J., Castroviejo, J., & Purroy, F.J. 1994. Species richness and endemism of birds in Bioko. *Biodiversity and Conservation* 3: 868–892.
- Perret, J.-L. 1966. Les amphibiens du Cameroun. *Zool. Jarhb., Abt. Syst.* 93: 289–464.
- Perret, J.-L. 1977. Les *Hylarana* (Amphibiens, Ranidés) du Cameroun. *Revue suisse Zool.* 84: 841–868.
- Petrides, G.A. 1965. *Advisory Report on Wildlife and National Parks in Nigeria, 1962*. Bronx, NY: American Committee for International Wildlife Protection.
- Powell, C.B. 1995. Wildlife Study I, Contract E-00019, Final Report. Submitted to Environmental Affairs Department, Shell Petroleum Development Company of Nigeria, Port Harcourt.
- Powell, C.B. 1997. Discoveries and priorities for mammals in the freshwater forests of the Niger Delta. *Oryx* 31: 83–85.
- Reid, G.McG. 1989. *The Living Waters of Korup Rainforest: A Hydrobiological Survey Report and Recommendations, with Emphasis on Fish and Fisheries*. WWF Report No. 3206/A8:1.
- Reid, J.C. 1989. Floral and faunal richness of Oban Division of Cross River National Park and list of flora and fauna of the Calabar Oban Area. Appendix 7 to *Cross River National Park (Oban Division): Plan for Developing the Park and its Support Zone*. Godalming, Surrey: WWF-UK.
- Richards, P.W. 1996. *The Tropical Rain Forest: An Ecological Study*. 2nd Ed. Cambridge: Cambridge University Press.
- Rodewald, P.G., Dejaifve, P.-A., & Green, A.A. 1994. The birds of Korup National Park and Korup Project Area, Southwest Province, Cameroon. *Bird Conservation International* 4: 1–68.
- Sarmiento, E.J. & Oates, J.F. 2000. Cross River gorillas: A neglected subspecies. *American Museum Novitates* no. 3304, 55 pp.
- Sayer, J.A., Harcourt, C.S., & Collins, N.M. (eds.). 1992. *The Conservation Atlas of Tropical Forests: Africa*. IUCN/Macmillan.
- Schiøtz, A. 1963. The amphibians of Nigeria. *Vidensk. Medd. Fra Dansk naturh. Foren.* 125: 1–92.
- Schiøtz, A. 1966. On a collection of Amphibia from Nigeria. *Vidensk. Medd. fra Dansk naturh. Foren.* 129: 43–48.
- Schiøtz, A. 1999. *Treefrogs of Africa*. Frankfurt am Main: Edition Chimaira.

- Schmitt, K. 1996. Botanical survey in the Oban Division, Cross River National Park. Calabar: Oban Hills Programme, Cross River National Park-WWF.
- Stattersfield, A.J., Crosby, M.J., Long, A.J., & Wege, D.C. 1998. *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. Cambridge: BirdLife International.
- Stiassny, M.L.J., Schlieven, U.K., & Dominey, W.J. 1992. A new species flock of cichlid fishes from Lake Bermin, Cameroon with a description of eight new species of *Tilapia* (Labroidei: Cichlidae). *Ichthyol. Explor. Freshwaters* 3: 311–346.
- Struhsaker, T.T. 2001. Africa's rain forest parks: Problems and possible solutions. Report to Center for Applied Biodiversity Science, Conservation International, Washington, DC.
- Sunderland, T.C.H., Mboh, H., Comiskey, J.A., Besong, S., Fonwebon, J., & Dione, M.A. 2002. *The Vegetation of the Takamanda Forest Reserve, Cameroon*. Unpublished draft report to the Smithsonian Institution, Washington, DC.
- Terborgh, J. 1999. *Requiem for Nature*. Washington, DC: Island Press.
- Teugels, G.G., Reid, G.M., & King, R.P. 1992. Fishes of the Cross River Basin (Cameroon-Nigeria): Taxonomy, zoogeography, ecology and conservation. *Annales de le Musée Royal de l'Afrique Centrale. Sciences Zoologique* 266. 132 pp.
- Thomas, D.W. 1984. Vegetation in the montane forest of Cameroon. In S.N. Stuart (ed.), *Conservation of Cameroon Montane Forests*. pp. 20–27. Cambridge: International Council for Bird Preservation.
- Thys van den Audenaerde, D.F.E. 1967. The freshwater fishes of Fernando Poo. *Verh. K. vlaamse Acad. Wet. Lett. Sch. Kunst. Belgie (Wet.)*, Jg. 29, no. 100. 167 pp.
- Trewavas, E. 1974. The freshwater fishes of Rivers Mungo and Meme and Lakes Kotto, Mboandong and Soden, West Cameroon. *Bulletin of the British Museum (Natural History), Zoology* 26: 331–419.
- Trewavas, E., Green, J., & Corbet, S.A. 1972. Ecological studies on crater lakes in West Cameroon: Fishes of Barombi Mbo. *Journal of Zoology, London* 167: 41–95.
- Tye, H. 1984a. Geology and landforms in the highlands of western Cameroon. In S.N. Stuart (ed.), *Conservation of Cameroon Montane Forests*. pp. 15–17. Cambridge: International Council for Bird Preservation.
- Tye, H. 1984b. The climate of the highlands of western Cameroon. In S.N. Stuart (ed.), *Conservation of Cameroon Montane Forests*. pp. 18–19. Cambridge: International Council for Bird Preservation.
- Usongo, L. 1997. Annotated list of known mammals of Korup National Park. Unpublished report in library of Korup National Park, Mundemba, Cameroon.
- Verheyen, W.N., Hulselmans, J., Colyn, M., & Hutterer, R. 1997. Systematics and zoogeography of the small mammal fauna of Cameroun: Description of two new *Lophuromys* (Rodentia: Muridae) endemic to Mount Cameroun and Mount Oku. *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique. Biologie* 67: 163–186.
- Vick, G.S. 1999. A checklist of the Odonata of the South-west Province of Cameroon, with the description of *Phyllogomphus corbetiae* spec. nov. (Anisoptera: Gomphidae). *Odontologica* 28: 219–256.
- Walter, H. 1973. *Vegetation of the Earth in Relation to Climate and Eco-Physiological Conditions*. New York: Springer-Verlag.
- Waltert, M., Lien, Faber, K., & Mühlenberg, M. 2002. Further declines of threatened primates in the Korup Project Area, south-west Cameroon. *Oryx* 36: 257–265.
- Werre, J.L.R. 2000. Ecology and behavior of the Niger Delta Red Colobus monkey (*Procolobus badius epieni*). Unpublished Ph.D. thesis. NY: City University of New York.
- White, F. 1983. *The Vegetation of Africa*. Paris: Unesco.
- Whitmore, T.C. 1975. *Tropical Rain Forests of the Far East*. Oxford: Oxford University Press.
- Wieringa, J.J. 1999. *Monopetalanthus* exit. A systematic study of *Aphanocalyx*, *Bikinia*, *Icuria*, *Michelsonia* and *Tetraberlinia* (Leguminosae, Caecalpinoideae). *Wageningen Agricultural University Papers* 99–4. 320 pp.
- Williams, P.H. 2000. *WORLDMAP*. Vers. 4.20.12. London: Natural History Museum.