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24 June 2003

Division of Management Authority
Branch of Permits
Attn: Swaziland elephants
U.S. Fish and Wildlife Service
4401 N. Fairfax Drive, Suite 700
Arlington, VA 22203
U.S.A.

Re: **Draft Environmental Assessment for Permit applications [PRT-060008 and PRT-060006]** for the import of African Elephants from Swaziland to the San Diego Wild Animal Park and the Lowry Park Zoo under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the U.S. Endangered Species Act (ESA).

Dear Sir/ Madam

This letter is to provide comments on the Draft Environmental Assessment prepared in support of a decision on the permit applications for the import of African elephants from Swaziland to two zoos in the United States. The comments are itemised with reference to sections and paragraphs of the text of the Draft EA, and are attached to this letter. A copy of my Curriculum Vitae is also attached, for your information.

As my CV shows, I have close to 30 years of professional experience in wildlife research, management and conservation, much of it in the context of African ecosystems in general and of African elephants in particular. In addition, I have worked for the past 15 years as a consultant and project manager in the broad sector of sustainable development, in a wide range of countries in Latin America, Asia and all parts of Africa. I believe that this experience has provided me with considerable insight into all aspects of the complex issues surrounding elephant ecology and conservation.

To summarize my comments, I have found serious inconsistencies and inaccuracies in the text of the Draft EA and my personal and professional opinion is that the conclusions reached by its author are misinformed, incorrect and unjustified. The Swaziland authorities are not managing their elephants in accordance to the current state of ecological knowledge, or indeed with any clearly thought-out strategy. The arguments put forward for the supply of the elephants to the zoos are entirely insufficient to counterbalance the considerable concerns over the welfare of captive elephants. A letter outlining these concerns has been sent to you from the collective membership of the Amboseli Elephant Research Project, of which I am part. I feel that it would be serious irresponsibility on the part of the Government of the United States to grant approval of the import permits and would set a dangerous precedent for similar applications in future. For this reason I would strongly advise against the approval of these permits.

Yours faithfully

Keith Lindsay

encl.

Detailed Comments on:

Draft Environmental Assessment for

Permit applications [PRT-060008 and PRT-060006] for the import of African Elephants from Swaziland to the San Diego Wild Animal Park and the Lowry Park Zoo under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the U.S. Endangered Species Act (ESA).

by Keith Lindsay

24 June 2003

I. Background

para 1

“Restoring the population extirpated in the 1940s” is given as the reason for translocating Kruger orphans to Swaziland in 1994. However, no information was given on the original population, its range or history. In any case, true “restoration of a population” would imply a return of elephants to play their ecological role in an area of former range. This is clearly not achieved by keeping a handful (a ceiling of 20 adults + calves) in small fenced enclosures, at a population size well below that of self-viability. Instead it represents the display of animals in large zoo.

para2

It is noted that under BGP “no formal management plan has been published”. Instead their authority seems to be based simply on “personal expertise” and the “Kruger Park management plan”. But which Kruger plan (that of 1986 or the revised version drafted in 1997? The 1997 Kruger plan and the 1998 Elephant Management Plan call for different approaches to elephant density in different zones of the park, with an emphasis on ecosystem dynamics, rather than outdated notions of fixed “carrying capacity”. The biologists and managers of Kruger have now recognised that ecosystems do not sit still but are in constant flux under the influence of ecological processes that continually shape and re-shape plant and animal communities through time and across different spatial scales. Although the habitat may be similar, Kruger is obviously a massive area with considerable scope for spatial heterogeneity and animal movement, while the Swaziland parks are tiny and confining (Mhaya = 76 sq km, Hlane = 300 sq km, with only a 10 sq km area in each given over to elephants). As noted above, the elephant areas in these reserves are little more than zoological displays. If the BGP approach to elephant management is to quote crude estimates of fixed “carrying capacity” densities from an out-of-date Kruger plan (n elephants per sq km, x hectares per elephant), this kind of extrapolation which ignores reserve size is entirely myopic and unjustified, as well as antiquated. It seems that the author of the Draft EA is unaware of these emerging issues.

“The protected areas managers have made statements that at this point in time, a reduction of the elephant populations is needed. Currently, the management strategy calls for a target number of 20 adult elephants in both managed areas.” As there is nothing written down to critique here, we cannot evaluate whether the arguments are based on sound technical reasons or simple seat-of-the-pants crisis management. Clearly the absence of a management plan has been accompanied by a lack of forethought. Just 9 years after introducing elephants as calves to the PAs, BGP have apparently realised (with surprise and indignation) that vegetation change is occurring and have decided that 20 elephants is the “correct” number that will stop or even reverse vegetation change. It should have been obvious from the outset, by the very nature of elephants as large, generalist herbivores, and with the great weight of publications on elephant-habitat interactions, that there would be vegetation change. There is no scientifically defensible reason to believe that reducing the elephant numbers to the magic number of 20 will be enough to allow the tree populations to recover their original density and structure. Either the managers have been extremely short-sighted, or they have intended all along to reduce numbers through export/ or culling once habitat change became visible; clearly they have no valid basis for making their management decisions, nor a research programme that is in touch with the current state of the art. The United States Government should not be seen to reward such an irresponsible approach to protected area management by approving its so-called technical arguments.

“The transfer of eleven elephants to the U.S. zoos in exchange for funding will provide financial support for the management of elephants in parks and game reserves, and allow for protection and eventual expansion of elephant habitat.”

This statement is extremely vague. How much would the one-off sale bring in relation to the annual BGP management budget and how much would actually be available for expansion of elephant habitat? Is this sale simply a drop in the bucket or is it a genuinely significant amount? (more details are discussed in comments below)

What precedent will this sale set, for Swaziland and for other countries? If this bid is successful, it is likely to be followed in Swaziland and small (or large) reserves elsewhere, so that selling off “surplus” elephants, whose inevitable habitat interactions were simply not considered in earlier actions, becomes a regular source of income. This opens the door for small reserves (such as the many private reserves in South Africa) stocked with “refugee” elephants from other PAs to become production farms for the international zoo market, a gross distortion of the ideal of nature conservation.

II. Purpose of the Proposed Action

para 1

More details are given here on finances and they provide no support for this sale. The return of the sale is specified here as US\$132,000. It is said that this amount will be used to support:

anti-poaching patrols of the protected areas by rangers;

expansion of the habitat by extending fenced areas;

anti-poaching gear such as Global Positioning System devices and radios; and

routine park maintenance.

It is extremely hard to see how this small lump sum could make a significant contribution to this extensive list. The only item that is realistic is the purchase of GPS equipment and radios. On the other items, elephant-proof fencing is extremely expensive to build and has considerable recurrent costs (nothing is said about land purchase) and the other two – anti-poaching patrols and routine park maintenance -- are annual costs that are not quantified (what is the annual anti-poaching and maintenance budget?) and ongoing in nature so that the effects of a one-off payment cannot be sustained. The author of the Draft EA has completely ignored the need to justify the income against costs.

“The import will also serve to increase the U.S. African elephant population...”

There is no “population” of elephants in the U.S., just scattered individuals or very small groups kept in near solitary confinement. The genetic diversity of this population is irrelevant as there is so little breeding, or prospect of breeding. This is not a species that has any sustainable future in captivity, as it always seems to rely on imports from the wild, and it is past time that the zoo community accepts this fact. Certainly the Division of Management Authority has a responsibility to take a lead on this issue.

“improve the development of more natural social relationships in elephant groups within the U.S.”

This statement makes no sense. How will bringing in traumatized juvenile animals and dumping them into existing captive groups (which sound as if they already have social problems) contribute to more natural social relationships? Does the author of this statement have any understanding at all of elephant social relationships under natural conditions?

Individuals in family units of up to 30 individuals have strong bonds developed over decades amongst animals who are almost exclusively closely related and have social knowledge of upwards of 2-300 known individuals. How can this be compared to a group of strangers forced into close proximity simply on the basis that their ages “look like” the age range seen in wild elephant groups? There is an extensive literature, and for those with reading difficulties, filmed documentary coverage of these facts.

“provide increased educational opportunity to improve the understanding of elephants by U.S. residents”

Zoos have next to nothing to offer in this area. It is much better to watch films of real elephants behaving naturally – walking, feeding, playing, mating, fighting – in truly natural social groups of up to hundreds of animals ranging widely across ecosystems than to see miserable captive elephants standing around in a bare enclosure, no matter how “naturalistic” the landscaping design may be.

III. Affected Environment

para2

The fenced areas where elephants are kept in each reserve amount to a very small proportion of the total area of each (Mkaya – roughly 12%, Hlane roughly 4%). While the elephants may be affecting the vegetation inside these fenced enclosures, they are having no effect whatsoever on the habitat of overwhelming majority of the area in each of the reserves. There can be no justification for removing elephants from the small fenced areas of some 10 sq km in each PA on the grounds of conservation of the “very high level of biodiversity”, whether tree-nesting vultures or the black and white rhinoceros which have 88-96% of the PAs to themselves. As noted above, even the logic of applying a fixed carrying capacity figure to the fenced elephant areas is out-moded, in the face of current understanding of the dynamic nature of savanna ecosystems.

However, on a broader level, the whole idea of these reserves sounds flawed in the extreme. The BGP should not have any elephants under its control in Swaziland if it does not have a big enough area to hold a viable population. Estimates of

the figure for Minimum Viable Population size vary, but something on the order of 200-1000 animals is certainly more realistic than 20. The Swaziland population can only be maintained in the long run through techniques similar to those being proposed for US zoos – population control, translocation in and out to maintain genetic diversity etc. The BGP should be encouraged to return the elephants to Kruger or other suitable area immediately and wait until they have a large PA estate before they attempt a second elephant experiment. For their part, the Kruger authorities were irresponsible for allowing Swaziland to take elephants into such unsuitable conditions, under the authority of an agency without a formal management plan. The Division of Management Authority would be equally irresponsible to approve such an approach to elephant management.

para3

The conditions described for each of the zoos, with enclosures of only 2-2.5 acres each, are entirely unlikely to provide the opportunity for elephants to experience “more natural elephant herd dynamics” – see the comments above which describe the marked contrast between behaviour that is possible in the wild and in captivity. Although such enclosures may be considered large by the standards of zoos, they are tiny compared to anything obtaining under natural conditions. There is no prospect whatsoever that elephants kept under this level of confinement could ever “form matriarchal groups, breed successfully, and raise offspring” despite the level of hopefulness of zoo management. Given that these conditions may be considered “good” within the US zoo community, there is little prospect that elephants can ever be kept in sustainable social groups in zoos.

The RSPCA study showed both significantly lower life expectancy and fertility for elephants and attributed this to the captive environment. Zoos have always had trouble getting elephants to breed, for reasons they appear unable to fathom. Reasons that are given in Section IV include: behavioral problems, age, medical conditions, or inadequate social groupings. It seems very likely that the elephants are generally extremely stressed and unhappy by the confining conditions of captivity. The optimistic view is expressed that “new medical information and improved husbandry techniques may correct past breeding and rearing problems” These techniques include attempts to achieve breeding through artificial insemination and hormone treatments. This is a ridiculous waste of funds, attempting to slap a technical fix over basic facts of nature. The money zoos spend per individual elephant would be spent MUCH more effectively on in situ conservation.

VII. Environmental Consequences of the Proposed Action and Alternative Actions

Alternative 1 (Proposed Action) Issue permit to import 3 males and 8 female elephants

para2-3

These arguments for the benefits to the Swaziland elephants are spurious and without technical foundation. Removing elephants through disruptive intervention is most unlikely to result in a development of a “more natural hierarchy among the remaining elephants”. The statements about the management of genetic diversity are equally disingenuous; it is admitted in the end that elephants will have to be moved in and out – this is not a “a common management tool with small populations”, apart from desperate situations where human land use or poaching pressures have reduced populations to the brink of extinction. The situation in Swaziland is the opposite – they have chosen to create small populations where it is not appropriate. It is, however, a practice commonly employed by zoos, which is what the Swaziland PAs represent, except that their enclosures are simply larger than those of the two US zoos, by a factor of 1000.

para5

The ecological statements in this paragraph represent an entirely flawed understanding of ecosystem dynamics and elephant-habitat interaction. It ignores age-structure effects of woodlands and elephants, the episodic and non-equilibrium nature of habitat change, effects of climate and other herbivores, the list is endless. It implies that BGP have understanding of habitat management but this is entirely spurious. Does the author of the Draft EA not realise this?

para6

The points about the minimal effect of the proposed fund transfer on PA management in Swaziland have been made above. Without substantial supporting evidence on the nature of expenditure, it is impossible to evaluate the judgement made by the EA author,

“As a result of this funding, the Mkhaya Game Reserve and Hlane National Park in Swaziland would receive better protection.”

Certainly the protection will be better than with no additional funds at all, but how much better and does it justify the disruption and suffering to be inflicted on the elephants?

para9

The concluding statement is entirely unjustified for reasons detailed above.

Alternative 2 (No action) Do not issue permit.

para1

It is stated that “From all indications, if the status of the elephants does not change, not only would the elephants' habitat worsen, but also the remaining elephants would suffer as they experience more competition for ever decreasing resources.” This form of argument flies in the face of any rational approach to an even basic understanding of ecosystem processes and their management. If managers intervened to remove animals from every situation in the wild where they might suffer from feeding competition, then the population of animals in zoos would be larger than that in the wild by several orders of magnitude.

Indeed, “The wildlife managers in elephant range countries have to decide for themselves what practical measures to take...” They should be encouraged to do so, but they can also be allowed to benefit from constructive advice; in this case, the Swaziland elephants should be translocated out entirely to a more suitable location. The USFWS has no need to get involved in that action unless it wishes to provide financial support for the rescue operation.

para2

The financial suffering of the BGP did not start from the date of this proposed sale, the modest proceeds will provide only temporary relief and the chronic problems will continue in the future. The financial argument is very weak indeed.

para5

This paragraph, which although does not state it outright, implies that the only alternative to approval of the sale is for the captured elephants to be shot. This is blackmail. Does the Division of Management Authority really want to set the extremely dangerous precedent of succumbing to this form of argument?

Curriculum Vitae

Personal Details

Name William Keith Lindsay
Date of Birth 5 November 1952
Nationality British/ Canadian dual nationality

Profession Natural Resource Ecologist/ Project Manager

Key Qualifications

Keith Lindsay is a natural resource ecologist with over 25 years' professional experience in Africa and North America, both in conducting and planning problem-oriented field research (Botswana, Kenya, Canada) and in senior administrative and management roles (Botswana, United Kingdom). He spent six years in Amboseli, Kenya, managing an ecological monitoring programme and undertaking research on elephants and their habitats with the Amboseli Elephant Research Project. Another five years was spent in Botswana, where his responsibilities included undertaking field-based research studies, planning for amelioration of land use conflicts on migratory wildlife, co-ordinating the activities of government and external researchers and advising on national policies for elephant conservation and protected area development.

Dr Lindsay joined the staff of The Environment & Development Group in Oxford, UK, in 1994, since which time he has taken over the management of its field projects in all parts of Africa – notably including Kenya, Tanzania and Uganda, Botswana, Namibia, Malawi, Zambia, Gabon and Cameroon – and in South-east Asia. All these projects are directly related to the relationships between biodiversity/natural resources and local communities and the national and local institutions for their management. He has supported and participated in short term consultancy missions in Africa and the Middle East, primarily in the domain of environmental monitoring and information systems in dryland areas, including the assessment of environmental and social impacts. He has also maintained his research interests in African elephants and their interactions with habitats.

Education

Academic

Ph.D. Zoology, 1995, University of Cambridge, UK. Title: *Feeding ecology and population demography of African elephants in Amboseli, Kenya.*
M.Sc. Zoology, 1982, University of British Columbia, Canada. Title: *Habitat selection and social group dynamics of African elephants in Amboseli, Kenya.*
B.Sc. (Hons.) Zoology, 1974, University of British Columbia, Canada.

Training Courses

GIS Distance Learning. Modules 2-4. February to November 2001. The Kingston University Professional Programme, Kingston-upon-Thames.
Managing Multiple Projects, Objectives and Deadlines, 1 November 1999, Skillpath Seminars, Birmingham.
Project Cycle Management (Office Instructions – Module 1), 11-13 December 1996, Department for International Development, London.

Languages

English: Spoken and written - fluent.
French: Spoken - basic, written – limited
Swahili: Spoken - basic.

Experience Record

Overview

1994 to date: Project Manager and Senior Consultant with The Environment & Development Group (EDG), Oxford, UK.

As Project Manager Dr Lindsay is responsible for providing technical backup and administrative support to a wide range of short- and long-term projects in the natural resources conservation/ sustainable livelihoods sector. As a Senior Consultant, he has undertaken a variety of short-term consultancies and assignments in wildlife/ range ecology, impact assessment and project cycle monitoring.

1978 to date: Elephant research in Amboseli, Kenya.

Since 1978, Dr Lindsay has supported the Amboseli Elephant Research Project (AERP), a long-term programme of ecological, behavioural and sociological studies. His role has focussed on feeding ecology and habitat relationships, data handling and habitat monitoring methodology. During 1978-79 and 1982-84, he undertook direct field studies in Amboseli National Park, while in the remaining time he has assisted the AERP with advice on the collection, handling and analysis of data, with particular reference to rainfall and vegetation dynamics and the use of Geographic Information Systems in analysing and displaying spatial data.

1988-92: Range/Wildlife Ecologist, Department of Wildlife and National Parks, Botswana (with Bonifica S.p.A., Rome, under contract to the European Commission).

The primary role was that of Range/ Wildlife Ecologist, advising on the ecological impact of, and making recommendations for, the development and management of waterholes for wildlife in relation to blocked migration routes in the Central Kalahari Game Reserve (CKGR). Other duties included Acting Head of the Research Division and Senior Wildlife Biologist at the DWNP headquarters office. Activities at DWNP headquarters included support to the planning and management of the CKGR, contribution to policy development in a range of areas including elephant management, problem animal control, waterpoint provision in several protected areas, veterinary cordon and other livestock fencing and research planning.

Elephant research and management

United Kingdom: MIKE data collection protocol (African Elephant Specialist Group, 2000)

Drafting – in early stages -- of a data collection format for the Monitoring of Illegal Killing of Elephants (MIKE) system, as requested by CITES of the IUCN/SSC African Elephant Specialist Group.

United Kingdom: Studying Elephants (African Wildlife Foundation, 1996)

Preparation of a chapter on "Studying Elephant-Habitat Interactions" in the edited publication, *Studying Elephants, No. 7 in the Technical Handbook Series of the African Wildlife Foundation, Kenya.*

Kenya: Data Management System for Amboseli Elephant Research Project (African Wildlife Foundation, September 1995)

Jointly facilitated a workshop on research priorities and advised the African Wildlife Foundation on a computer-based management and analysis system for the long-term data collected by the Amboseli Elephant Research Project.

Botswana: Meeting on "The African Elephant in the Context of CITES" (EC, September 1994)

Technical assistance in the preparation of background documentation for and facilitation of an international meeting on "The African Elephant in the Context of CITES" held in Botswana in co-ordination with the DoE (UK), the EC and the US Fish & Wildlife Service.

Botswana/ Japan: Eighth Conference of the Parties to CITES (Department of Wildlife and National Parks, March 1992)

Supporting Advisor on elephant management to the Botswana delegation at the 8th Conference of the Parties to CITES, in Kyoto, Japan in March 1992.

Botswana: Elephant management policy and research, (Department of Wildlife and National Parks, 1991-1992)

Contributed to the development of the 1991 Elephant Management Plan. Reviewed research proposals and supported activity of DWNP and private researchers on elephant-related projects.

Kenya: PhD Researcher (University of Cambridge, 1982-88, 93)

Field research, data analysis and writing of dissertation on distribution and ranging, feeding ecology, and demography of African elephants in Amboseli National Park, Kenya. Advising the Kenya Government on elephant management options. Funding came from the Natural Sciences and Engineering Research Council, Canada, the New York Zoological Society and the East African Wildlife Society.

Kenya: MSc Researcher (University of British Columbia, 1978-82)

Field research, data analysis and writing of dissertation on habitat selection and social dynamics of African elephants in Amboseli National Park, Kenya. Funding came from the Natural Sciences and Engineering Research Council, Canada, and the New York Zoological Society.

Consultancy and employment experience

United Kingdom (EDG): Environmental Scoping of the Proposed Rehabilitation of the Kisangani-Ubundu Road,

Democratic Republic of Congo (DFID, March 2003)

Information gathering and analysis and report-writing for a desk-based scoping exercise, both to examine the issues raised in a previous technical and financial feasibility study and to consult as widely as possible among professionals with an interest in eastern DRC, for their views on the environmental aspects of the Kisangani-Ubundu road rehabilitation proposals.

South-East Asia (EDG): Institutional Sustainability mission, ASEAN Regional Centre for Biodiversity Conservation

(European Commission, March-April 2003)

Served as part of a four-person team of international and local consultants to prepare a report including, *inter alia*, a long-term plan for the continued activities of ARCBC for a period of up to 5 years beyond the current project ending date of February 2004. Suggested how the long-term values and activities developed under the current project could be sustained.

Trinidad and Tobago (EDG): NE Tobago Management Plan (European Commission, June 2002)

Provided expertise on environmental guidelines for road development through a forest/ coastal region (following World Bank guidelines), institutional capacity appraisal and GIS-based thematic mapping in support of a multi-disciplinary team engaged in producing a development plan for the north-eastern region of Tobago.

Botswana (EDG): EIA/ Audit of Veterinary Fences in Ngamiland (DFID, July 1999-September 2000)

Deputy Team Leader and Wildlife Sub-team Leader on a multi-disciplinary group of experts engaged in an EIA/audit of veterinary cordon fences in Ngamiland District of northern Botswana.

United Kingdom: Workshop on Biological Fieldwork Techniques (BP Conservation Programme, April 1999)

Co-facilitator of a workshop on Biological Fieldwork Techniques, Large Mammals, as part of the BP Conservation Programme and Royal Geographical Society's Expedition Advisory Centre.

Botswana (EDG): Final Review of DFID Support to the Department of Meteorological Services (DFID, June 1998)

Team Leader and Environmental Specialist on the Final Review of a project established to develop remote sensing and GIS systems and train people to provide reliable technical information on climate and weather patterns and the condition of Botswana's rangeland.

Botswana (EDG): Final Review of the Botswana Range Inventory & Monitoring Project (DFID, April 1998)

Environmental Specialist on the Final Review of a project whose purpose was to support and strengthen the range ecology, remote sensing, cartography and monitoring and evaluation sections of the Ministry of Agriculture.

Southern Africa (EDG): Review of Donor Funding for Conservation (US Fish & Wildlife Service, 1995-96)

Visited wildlife departments and local offices of international donors in Botswana, Namibia, South Africa, Zambia and Zimbabwe in an exercise to compile information on donor funding in the wildlife sector.

Jordan: National Range Rehabilitation and Development Programme (International Fund for Agricultural Development, July 1995)

Rangeland Specialist in a team with the Environmental Research Group Oxford, (ERGO), advising IFAD and the government of Jordan on remote sensing and field-based techniques in the development of a Pastoral Resource Assessment and Monitoring Component for its proposed National Range Rehabilitation and Development Programme.

United Kingdom: GIS and Remote Sensing for Protected Area Management (Natural Resources Institute, 1995)

Preparation of a chapter on "Wildlife tracking, remote sensing and GIS as tools for Protected Area management in Africa" in a prototype workbook, *GIS and Remote Sensing for Protected Area Management* for the Natural Resources Institute, UK.

Botswana: Initial Measures for the Conservation of the Kalahari Ecosystem (EC, 1988-92)

Range/ Wildlife Ecologist, advising on the ecological impact of and making recommendations for the development and management of waterholes for wildlife in relation to blocked migration routes in the Central Kalahari Game Reserve (CKGR). Other duties included Acting Head of the Research Division and Senior Wildlife Biologist at the DWNP headquarters office.

Kenya: Ecological monitoring in Amboseli National Park (New York Zoological Society, 1982-83)

Operation of an ecological monitoring programme in Amboseli National Park, Kenya. Activities included vegetation monitoring, aerial census of wildlife by systematic reconnaissance flights and total counts, training and supervision of a Kenyan field assistant and data preparation and analysis.

Canada: Ecological studies of snowshoe hares (University of British Columbia, 1980)

Assisted field study of snowshoe hare population regulation in boreal forest of western Yukon Territory, Canada. Activities included vegetation sampling and small mammal census/ trapping.

Kenya: Ecological monitoring in Amboseli National Park (New York Zoological Society, 1977-79)

Operation of ecological monitoring programme in Amboseli National Park.

Canada: Wildlife research (Fish and Wildlife Branch, Government of British Columbia, 1975)

Activities included a survey of coastal peregrine falcons, immobilisation, radio-collaring and radio-tracking of grizzly bears and operating from remote field camps.

Canada: Wildlife inventory and research (Provincial Co-ordinator for Wildlife Inventory, Fish and Wildlife Branch, Government of BC, 1974-75)

Retrieval and filing of wildlife inventory data from province-wide sources in a centralised database.

Canada: Wildlife research (Fish and Wildlife Branch, Government of British Columbia, 1974)

Assisted in a study of the distribution and ecology of grizzly bears and mountain goats in a remote coastal mountain forest of British Columbia, Canada. Activities included ground-based surveys of carnivores and ungulates and construction and operation of field camps.

UK-based project management (EDG)

As Project Manager for The Environment & Development Group, Dr Lindsay has been responsible for providing technical and administrative support to a large number and variety of projects. Such support has included project design and result monitoring, managing relations with clients and consultants, logistical and procurement arrangements and technical support to field personnel (including site visits). Details of the projects can be found in the Annex, but they have included work in the following geographical and sectoral areas for donor, governmental, non-governmental and private sector organisations:

Sectoral areas

- strategic land use planning (roads, infrastructure, socio-economic analysis), focussing on sustainable development;
- project/ programme design, monitoring and evaluation;
- information systems and regional co-ordination;
- protected area planning and development implementation, including biodiversity monitoring and conservation, revenue generation through sustainable agriculture, forestry and ecotourism, with emphasis on local community involvement;
- community-based natural resource management, wildlife/ natural resource -based enterprise development;
- institutional analysis, change management and capacity building.

Geographical areas

- Africa, including Botswana, Cameroon, Gabon, Kenya, Malawi, Namibia, Tanzania, Uganda and Zambia.
- South-East Asia, including the Philippines (and ASEAN in general), Vietnam.

- Caribbean and Latin America, including Trinidad & Tobago and Guyana.

Publications

Scientific reports and publications:

- Lindsay, W.K. (1996) Wildlife tracking, remote sensing and GIS as tools for protected area management in Africa. UNITAR Workbook.
- Lindsay, W.K. (1995) Studying elephant-habitat interactions. in K. Kangwana (ed.) *Studying elephants*. African Wildlife Foundation Technical Handbook Series No.7, Nairobi.
- Lindsay, W.K. (1993) Elephants and habitats: the need for clear objectives. *Pachyderm*, 16:34-40.
- Lindsay, W.K. (1991) Food intake rates and habitat selection of elephants in Amboseli, Kenya. *African Wildlife: Research and Management*. International Council of Scientific Unions, Paris, pp.88-92
- Lindsay, W.K. (1990) Elephant/habitat interactions. In: P. Hancock (ed.) *The Future of Botswana's elephants*. Kalahari Conservation Society, Gaborone, pp. 19-23
- Lindsay, W.K. (1987) Integrating parks and pastoralists: some lessons from Amboseli, Kenya. in D. Anderson and R. Grove (eds) *Conservation in Africa: People, Policies and Practices*. Cambridge University Press, Cambridge, pp.149-167
- Inamdar, A., de Jode, H., Lindsay, K. & S. Cobb (1999) Capitalizing on nature: protected area management. *Science* 283: 1856-1857.
- Gillson, L. & K. Lindsay (in press) Ivory and ecology – changing perspectives on elephant management and the international trade in ivory. *Environmental Science and Policy*.
- Gillson, L. & K. Lindsay (2002) *Ecological Reality Questions the Need to Cull*. Briefing document to the 12th Conference of Parties to CITES, Care for the Wild International.
- Gordon, I.J. & W.K. Lindsay (1990) Could mammalian herbivores “manage” their resources? *Oikos*, 59: 270-280.
- Western, D. & W.K. Lindsay (1984) Seasonal herd dynamics of a savanna elephant population. *African Journal of Ecology*, 22:229-244.
- Young, T.P. & W.K. Lindsay (1988) Role of even-age population structure in the disappearance of *Acacia xanthophloea* woodlands. *African Journal of Ecology*, 26:69-72.

Popular articles:

- Lindsay, W.K. (1986) Trading elephants for ivory. *New Scientist*, 112(1533): 48-52.
- Lindsay, W.K. (1986) Elephant problems and human attitudes. *Swara*, 9(3):24-27.
- Lindsay, W.K. (1983) Elephants, trees and people. *Wildlife News*, 18:8-11

Annex 1: Details of EDG projects managed by Keith Lindsay

Long-term projects:

Trinidad and Tobago: NE Tobago Management Plan (European Commission, 2001-2003)

Elaboration of a development plan for Northeast Tobago. EDG, in conjunction with Trinidad-based Kairi Consultants, are managing a team of international and local experts to define the study's scope and approach, review existing secondary data and literature, consult with stakeholders, analyse the material collected and prepare a development strategy and management plan for the coastal communities and tropical forest of the biodiversity-rich northeastern region of this small Caribbean island. Part of this work involved the development of Environmental Mitigation Guidelines for the L'Anse Fourmi – Charlotteville Road in the development area.

South-East Asia: ASEAN Regional Centre for Biodiversity Conservation (EC, 1999-2003)

The overall objective of the project is to intensify biodiversity conservation in the ASEAN countries through improved cooperation in a comprehensive regional context, by helping to set up a network of institutional links among and between ASEAN countries and European partner organisations. This aim is approached by supporting the establishment of a Regional Centre for Biodiversity Conservation (ARCBC), located in Los Banos, Philippines. EDG is working in collaboration with SECA (France), and is supplying the services of the Team Leader and several short-term consultants.

Vietnam: Protected Areas Resource Conservation (PARC) Project (UNOPS, 1999- 2003)

EDG is working in two northern protected area sites, the Na Hang Forest Reserve and Ba Be National Park and one southern site, Yok Don National Park. Our work focuses on a system of project planning in which local partners and stakeholders have a high degree of involvement. The project aims to improve infrastructure in the two sites, to design education centres and outreach programmes, and to increase ecotourism opportunities.

Cameroon: Environmental Foundation (Exxon Corporation, July 2000– 2003)

As part of the Environmental Management Plan associated with the construction of an oil pipeline from Tchad to the Atlantic coast of Cameroon, Exxon wishes to establish a sustainable funding mechanism to finance a number of measures in favour of two protected areas and a group of forest-dwelling people. In January – May 1999, the Environment and Development Group was commissioned to review the issues involved and to design the initial administrative and legal aspects of a social and environmental Foundation to provide long term support to defined activities in Cameroon. The implementation of this Foundation was initiated in July 2000.

Gabon: Improvement of Wildlife Viewing in Lopé National Park (EC, 1999- 2002)

Gabon has yet to be widely recognised as an international tourist destination, and the number of visitors to its primary protected area, Lopé National Park, has been declining in recent years. EDG worked with partners in Gabon on attracting a greater number of visitors, increasing sustainable employment in the nature tourism industry, and increasing revenues and ensuring that their distribution is felt to be appropriate by local and national stakeholders.

Namibia: Northern Namibia Environmental Project, (DFID, 1996-2002)

The project aimed to improve the capability of the Ministry of Environment and Tourism to plan and manage the natural resources of the north of the country in ways which are both sustainable and beneficial to the rural economy. EDG is providing a full technical assistance team to gather and co-ordinate data, to develop a natural resource planning framework, and to develop pilot projects in community-based conservation and tourism at village level.

Botswana: Wildlife Conservation and Utilisation in Central and Southern Botswana (EC, 1995-2001)

EDG assisted the Department of Wildlife and National Parks in developing and implementing management plans for three large protected areas. Achieving sustainable benefits for local communities through wildlife-based tourism presents a key objective in the challenging environment of the Kalahari Desert.

Botswana: Institutional Strengthening of Wildlife Department (DFID, 1996-98)

EDG provided a senior adviser and supporting specialist consultancy services to steer the Department of Wildlife and National Parks (DWNP) through a process of change, over which Department staff had a high degree of control.

Uganda: Promoting Wildlife Management at the District Level (EC, 1995-97)

EDG encouraged and assisted Ugandans to manage and develop their wildlife resources at the district level, in accordance with the Government of Uganda's decentralisation policy and policies of the new Uganda Wildlife Authority

Kenya: Community Based Conservation by Pastoralists (EC, 1995-98)

The Environment and Development Group provided training, equipment and policy advice to the Namunyak Wildlife Conservation Trust, a grass-root conservation organisation based in the Sarara-Sabache group ranch of Samburu District.

Tanzania: Nature Conservation Authority for Zanzibar (EC, 1995-98)

The Environment and Development Group assisted relevant ministries of the government of Zanzibar to establish a financially sustainable system of protected areas through institutional development and a pilot protected area project.

Short term projects:

Guyana: Multi-donor Mid-term review of the Iwokrama Sustainable Forest Conservation Programme (DFID, September 2000-January 2001)

The Iwokrama Centre is an ambitious multi-donor programme which seeks to demonstrate that the combined global and national/local benefits from forest goods and services can make tropical rainforest conservation and management sustainable. The objectives of the review mission were to: i) examine the progress the Centre has made with the implementation of its Operational Plan (1998-2002); and ii) recommend changes that may be needed in the management and funding of the Centre in the remainder of the first phase of the operation. EDG managed the entire review process on behalf of DFID, from selection of the team of consultants to ensuring delivery of a quality final report

Malawi: Institutional strengthening/ Management Plan preparation for the Mulanje Mountain and Michesi Forest Reserves (Mulanje Mountain Conservation Trust (MMCT), World Bank and DFID, February-May 2000)

The combined output of these two consultancies was a management plan for implementation by the Forestry Department and other stakeholders, notably MMCT, and a strategy for strengthening those institutions.

East Africa: Mid-Term Review of the Wildlife Enterprise and Local Development Project (EC, September-December 1999)

EDG's team evaluated the performance of the African Wildlife Foundation's WELD project in terms of achievement of targets and objectives. The consultants also evaluated the potential contribution of the project to conservation and development in the region, and made recommendations concerning future EC interventions in the field of community conservation in the region.

Malawi: Ecotourism Consultancy for MMCT (World Bank, 1999)

The objective of the EDG's input was to formulate a tourism strategy for the sustainable utilisation of the Mulanje Massif, identifying key features and areas of ecological significance and visitor interest and reviewing existing tourist facilities and infrastructure on and around the mountain. The planning was undertaken in the context of the overall Malawian, and regional, tourism scene, with local communities participation in development planning forming a crucial part of the work.

Zambia: Mid Term Evaluation of and Appraisal for a New Project for the "Development of Sustainable Wildlife Management towards the Diversification of the Zambian Economy" (EC, September 1998– January 1999)

The project aimed to provide institutional support and restructuring for the National Parks and Wildlife Service in preparation for its transition to parastatal status, and to develop the capacity within the NPWS for producing management plans for the protected areas and associated Game Management Areas of Zambia. The Evaluation looked at project outputs against its purpose and the appraisal provided a detailed draft financing proposal for a follow-on project of support.