

BFA SEMINAR SERIES No. 36

Elephants and their Impacts in South Central Africa

Drew Conybeare

Held at Christian Brothers College, Bulawayo, Thursday 21 April 2005.

The survival of the African Elephant (*Loxodonta africana*) is a much discussed topic both in Africa and internationally, and raises many emotional questions. The main one is how to maintain an equilibrium between elephants and the ever expanding human population, both demanding land to feed themselves. Secondly, how many elephants are there, do their numbers need to be managed, and how should they be managed? Internationally, elephants are seen as the epitome of African wildlife which are being 'decimated' by poaching, but in Africa, people and other wildlife are feeling the effects of the elephant feeding habits and behaviour in a unfavourable way.

Elephant distribution in south-central Africa is now very fragmented with few large areas of contiguous elephant range. The largest of these, where there are estimated to be about 175,000 elephants, covers Hwange/Matetsi/Victoria Falls from Zimbabwe into Zambia and extends across northern Botswana, through the Caprivi Strip into southern Angola.

Summary of elephant impacts

The effect of elephants at high densities is to change the physiognomy of woodland and wooded bushland in particular, by reducing the number of trees, and also by changing plant species composition if heavily used species decline in abundance or biomass and avoided species increase. As a result of tree breakage, there may also be an increase in shrub density from coppice trees, but shrub species composition will be changed and density may also ultimately be reduced. Tree regeneration is slowed or arrested by elephants and other browsers, as well as by fire and frost. Some vegetation types are more affected than others, e.g. riverine, miombo and mopane woodlands compared to *Baikiaea* woodland.

The impacts of elephants on vegetation are positively related to elephant density, but the rate and amount of vegetation change is affected by a number of other factors, such as proximity to water, variation in annual rainfall, fire, frost and soil type. Even at low overall elephant density there will be areas of relatively high elephant concentration where impacts will be more severe. For example, at the very low elephant density of 0.13 per sq. km there were areas of severe vegetation damage in Kruger National Park. Miombo may be destroyed at elephant densities as low as 0.2-0.5 per sq. km. When elephants recolonize an area from which they have been absent for some time, impacts are likely to be dramatic.

Changes to the vegetation caused by elephants also affects other species of animals and arboreal birds are particularly vulnerable. The effect of vegetation change on other animal species has not been well studied but there is evidence that gross vegetation change will result in declines in numbers of most other browsers. Changes to woodland physiognomy also affect the herbaceous layer, but these changes and the effect of vegetation change on grazing animals have not been fully investigated. When water is limited in the dry season, very high elephant numbers may affect other species through competition for this resource.

At low to moderate densities the impact of elephants may increase habitat heterogeneity, particularly in a homogeneous environment, and this may in turn lead to an increase in biodiversity. At high densities, the opposite probably occurs.

Unanswered questions

In spite of all the work done on elephant impacts a number of questions remain for which there are no clear answers. Are current increases in elephant density reducing diversity of vegetation and other animals? At what point will densities of unmanaged elephant populations stop increasing? Will populations stabilize and fluctuate or crash? What will be the effect of even higher densities on different vegetation types, and on other animals? Will higher numbers of elephants and the associated changes to vegetation lead to accelerated soil erosion and affect stream flow?

What have been the long term dynamics of elephant numbers? There is a theory that elephant densities 100 years ago were artificially low as a result of ivory hunting. If so, what was the status of elephant populations in the past, before modern ivory hunting? What factors controlled/regulated elephant population levels? Are current trends in elephant densities a return to former conditions? Or are they a response to protection and confinement?

Future trends

The average rate of elephant increase will decline. The final outcome may be an equilibrium where elephants are limited by the resources available within foraging range of late dry season water supplies.

Current trends of vegetation change will continue, but ultimately some sort of stability should be established by which time considerable change will have occurred. The extent of woodlands will be much reduced and that of bushland and wooded or bushed grassland will have increased.

The abundance of some browsing animals, selective grazers and arboreal birds will decline while there may be an increase in some other grazers, mixed feeders and terrestrial birds and changes to the diversity of invertebrate fauna. Conservationists must attempt to ensure that rare or specialised species are not lost from ecosystems as a result of elephant induced habitat change.