

end like Humpty Dumpty. It need not. Given the spectre of ever more fragmentation, we need plenty of practice to make sure we can do so routinely and cheaply. In putting the smaller

rhino pieces together again, we can learn lessons for patching up other Humpty Dumpties.

David Western

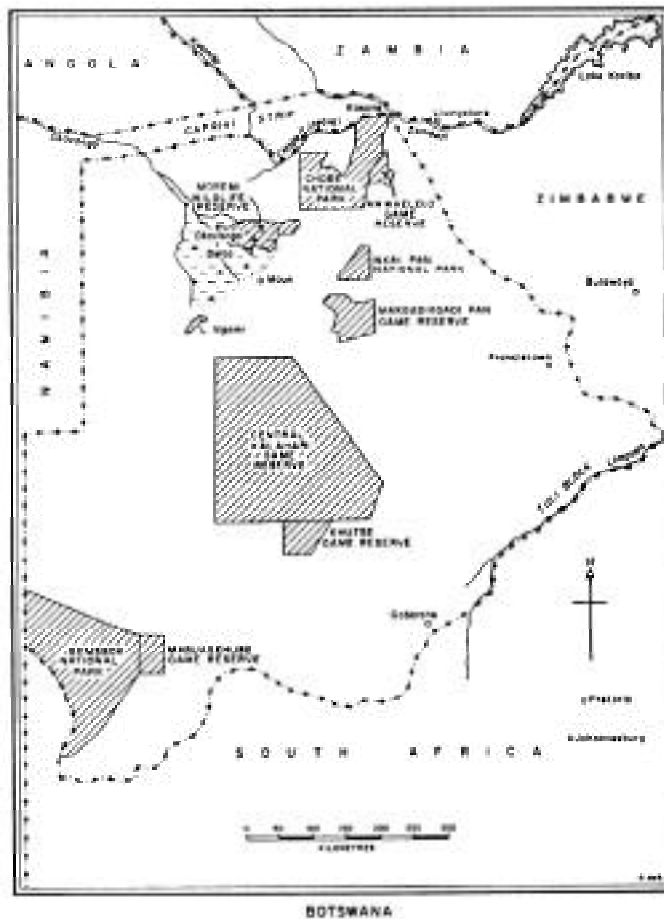
The Ivory Industry in Botswana

For a long time, most countries in southern Africa have exported considerable quantities of raw ivory to Europe and Asia, where various commodities are manufactured from it, and many items have been sent back to the source countries for sale. When international tourism to Africa became a major industry in the 1960s, beads, bangles and other ivory jewellery from India and Hong Kong could generally be found in African curio shops. More recently, the slowing of economic growth, scarce foreign exchange and vast unemployment have encouraged entrepreneurs in some of these African countries to start their own businesses to earn money from producing the types of ivory items mainly in demand by tourists.

African production of ivory commodities has met with varying success. Even in South Africa, which attracts hundreds of thousands of foreign visitors every year and where ivory pieces are among the major products sold in curio shops, locally manufactured ivory jewellery could not compete with that from Hong Kong were it not for the transport costs and 25% duty imposed on the latter. On the other hand, some of the locally carved statues of wildlife in South Africa are masterpieces and recognized as such by ivory collectors all around the world. In Zimbabwe, where the annual retail value of locally made ivory commodities is approximately \$8 million, it is the residents and citizens of the country who buy most of the ivory items made there, to take with them to sell for hard currency when they go abroad.

While Botswana has not been a major source for raw ivory on international markets, it has attracted European sport hunters since the nineteenth century, and trophy ivory continued to be exported from the country until very recently. Botswana's ivory manufacturing industry started in 1975, one year before South Africa's and two years after Zimbabwe's. The company which began commercial ivory manufacturing, Botswana Game Industries (B G I), hired an English jeweller to teach some local Africans how to make ivory beads, bangles and lighters at its headquarters in Francistown, northern Botswana close to the major elephant populations. The company expanded its workforce to 20 ivory craftsmen and in 1976 began producing carved tusks and small sculptures of elephants and buffaloes. However, the carvers had no previous experience their workmanship was inferior and it did not look as if the enterprise would be profitable. In 1977 B G I stopped producing carvings, and in 1979 closed down the part of the factory that manufactured ivory beads, bangles and lighters.

There were relatively few foreign tourists visiting Botswana, and B G I was not competitive on international markets with the production from Hong Kong, which was considerably cheaper because the Chinese are better skilled, waste less ivory and work longer hours. Despite being exempt from the 20% to 25% import duty in South Africa (because Botswana is a member of the Customs Union), B G I's worked ivory could not make significant inroads even there.



B G I had consumed between two and three tonnes of ivory a year from 1975 to 1979, which it had bought from local licensed hunters, licensed traders and from the Botswana government. One of the directors used some of the ivory waste to fertilize the roses in his garden; he could find no other use for it.

A second ivory carving factory started up in Francistown in 1975, but was put up for sale in 1977. Iosef Generalis, a Greek, bought it. Called Ivory Products, this company now has 25 ivory craftsmen, although only eight are carvers. Some are former B G I employees, and the others are labourers from the area around Francistown, mostly Kalanga men. Using electric drills, lathes and other tools, they make jewellery (mainly bangles), candlesticks, lamps, lighters, salt and pepper shakers, napkin rings and smoking pipes. The carvers produce designs on whole tusks and sculpt African tribal head statues and small elephants. They work a 45-hour week and are paid for each piece they make, averaging \$138 a week. One highly skilled Zimbabwean carver working for Ivory Products earned on average \$300 a week in 1983. Approximately 40% of the finished ivory pieces are exported to South Africa; most of the rest go to Germany and the United States;

only about 15% are sold within Botswana, in Francistown, Gaborone (the capital city) and Maun. Mr Generalis obtains his raw ivory mainly from the Department of Wildlife, National Parks and Tourism which put up for sale by tender 2.2 tonnes of ivory in 1983, confiscated from poachers, found in the field and acquired from control work. Mr Generalis bought all of it, which had an average tusk weight of eight kilos, for \$42 a kilo, which was just about the world market price. From 1977 to 1981 Ivory Products consumed an annual average of 1.3 tonnes, but in 1982 this figure increased to 2.5 tonnes. Mr Generalis ivory business has become the largest and most successful in Botswana.

Another ivory manufacturing firm in Francistown, Bushman Products, consumed between 1979 and 1982 an average of 400 kilos of ivory every year for making jewellery. In the capital city there is just one ivory carver (an expatriate), and there is a former resident of Zimbabwe now in Maun who makes belt buckles, bangles and a few other accessories.

Botswana has more than enough elephants to support the local ivory manufacturing industry. There are a minimum of 20,000 elephants, and perhaps a lot more. If the elephant population is increasing at the same rate as neighbouring Zimbabwe's, which is five per cent per annum, then 1,000 animals could be removed each year. These would produce 15 tonnes of ivory, well in excess of the three tonnes of raw ivory required by the ivory manufacturers.

However, according to officers of the Department of Wildlife, National Parks and Tourism, over the past few years there has been a significant increase in elephant poaching, and it is not known whether or not this has caused a decline in their total numbers. The illegal killing of elephants has been most severe in the extreme northern part of Botswana; poachers from Namibia have crossed the eastern Caprivi Strip and shot elephants along the Chobe River; furthermore, the elephants have also been disturbed by licensed hunters. As in Kenya's Tsavo area in the 1960s when elephants moved inside the boundaries of the parks for protection, so have many elephants in Botswana retreated into sanctuaries. Both Chobe National Park and Moremi Wildlife Reserve have attracted great numbers of elephants from surrounding areas, with the result that the vegetation in both these places has suffered severely. The Department of Wildlife, National Parks and Tourism is very concerned about the effects of elephant predation, and particularly about the loss of many trees in Chobe and Moremi. It requested a scientific study to be carried out on the elephants and the vegetation of northern Botswana, in view of the need to develop a proper management plan for the region. Fortunately, a research project commenced in 1983 to make an estimate of the northern populations and to attempt to answer the questions posed by the Department, regarding habitat destruction by elephants. It is sponsored by the Endangered Wildlife Trust and the University of the Witwatersrand, but it will take many months to complete and will cover only part of the range of Botswana's elephants.

In the meantime, all elephant hunting in Botswana has been stopped. In 1976 606 elephant hunting licences were granted: 194 to citizens, 207 to residents of the country and 205 to non-residents. The total numbers then decreased to 567 in 1979, 448 in 1980, 392 in 1981 and 104 in 1982 (68 to citizens, 6 to residents and 30 to non-residents in that year). Some hunters who had a licence to kill one elephant exploited the system. In Botswana, any elephant tusk weigh-

ing less than 10 kilos is considered to be from an immature animal and consequently illegal. All such tusks are confiscated by the Department. Some hunters who shot an elephant with small tusks would either just leave them in the bush or sell them illicitly and hunt another animal to take its place on the licence.

Towards the end of the legal hunting period, a lot of the Department's time was taken up in allocating the elephant licences. Simply put, many, many more people wanted to shoot an elephant than there were licences available. A great deal of money could be made from selling various parts of the animal. In 1982 the minimum-sized pair of legal tusks brought about \$900; the hide from an average bull elephant (180 kilos) was worth \$420, the four feet (for making baskets) \$93, the ears \$18 for the pair, the trunk \$28 and the tail \$9. Thus, BG I in 1982 paid a hunter at least \$1,468 for 20 kilos of ivory and the other commercial parts of an elephant, excluding its meat. The licence fee at that time was only 100 pula (about \$93) for a citizen, 300 pula for a resident and 600 pula for a nonresident.

In 1980 when David Peacock (now Senior Game Warden) was in Kasane, 100 elephant licences were allocated for his area but there were over 10,000 applicants for them! A draw system was introduced, but to alleviate the massive paper work involved in granting the licences, the Department should have increased their price very substantially, which in turn would have also increased the Botswana government's share in the profits of the hunts. The elephants are a national asset, and the few lucky hunters should not have been allowed to reap so high a percentage of the financial rewards.

It is imperative for the Department of Wildlife, National Parks and Tourism to tighten up its law enforcement to reduce poaching and to bring a halt to the illegal movement of ivory. It should also probably try to implement some of the controls on the ivory manufacturing businesses that have worked so successfully in Zimbabwe, such as the registration of all ivory carvers and the ivory they use.

So that ivory manufacturers are not tempted to purchase illicit tusks during the elephant hunting ban, the Department should continue to sell all the raw ivory it collects. Compared with the Zimbabwe ivory industry which consumed about 15 tonnes of ivory in 1982, or the South African one which used six tonnes, Botswana's industry is quite small and requires only three tonnes a year. Yet, the ivory pieces are primarily exported, and the Botswana government makes \$1.32 (1.43 pula) from an export tax levied on every kilo of worked ivory.

The country has a much larger elephant population than South Africa, and its prospects for an increase in tourism are very good. There is, indeed, considerable potential for expansion in the Botswana ivory industry, and there are valid reasons why the Department should encourage it as a rational use of a renewable resource. It is understandable that the governments of southern Africa want to benefit from having ivory manufacturing and carving businesses in their own countries; but in Botswana there are some very serious drawbacks due to unskilled carvers who waste a lot of raw ivory and make poor quality items. This could be rectified by bringing in a few master craftsmen from Zimbabwe to teach them better methods of cutting up a tusk and better techniques in carving and finishing their pieces. Botswana presently has only about 30 ivory craftsmen; given supervision and help from specialists, they could improve the quality of their carved African animals (one of the most popular of ivory items on

the market) and they could experiment with making different ivory commodities such as good jewellery with African pastoralist designs. Skill and ingenuity are necessary if the industry even intends to gain a larger share of Botswana's own ivory market, over half of which is now supplied by imports from South Africa and Hong Kong.

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Esmond Bradley Martin

Law Enforcement in Malawi Conservation

A MONITORING SYSTEM

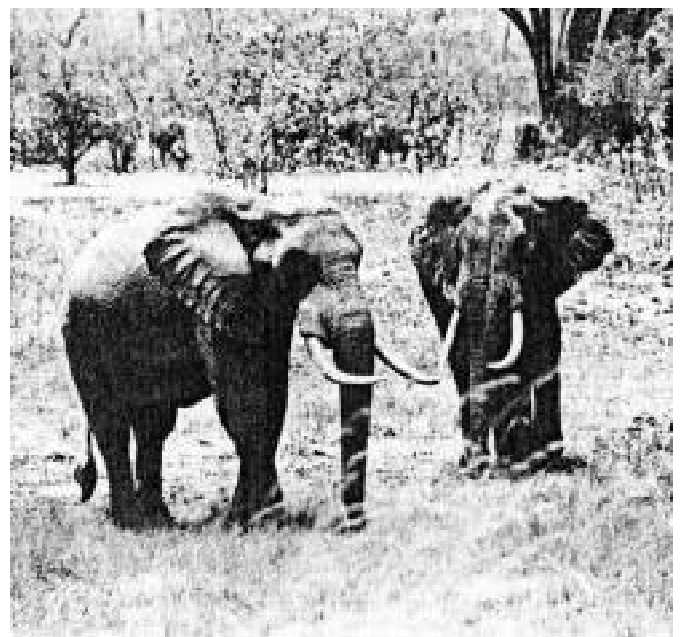
The use of wildlife resources, plant and animal, has been basic to human ecology since the origin of man. Conservation legislation has created a new class of illegal activity, broadly known as poaching, and has swept progressively more forms of wildlife use into it, until in some areas, most are illegal. This situation has created a conflict of interests and value systems between the conservation establishment and the general public. As a result, a high proportion of all conservation effort in terms of staff and expenditure is devoted to law enforcement.

Because of the importance of illegal activity and law enforcement in African conservation areas, the Wildlife Research Unit of the Malawi Department of National Parks and Wildlife has been attempting over the last 7 years to develop a system for monitoring the quantity of illegal activity and of law enforcement effort by area and by time period. This allows us first to assess the ecological and economic significance of illegal activity in a particular area; second, to allocate-priority to funding and effort for law enforcement programmes; and thirdly to assess the effectiveness of different types and intensities of law enforcement effort.

The method is simple and involves little more than common sense. It is based on the systematic use of patrol reports produced by field staff. The system is intended firstly to quantify patrolling effort by various measures; secondly to quantify illegal activity encountered by patrols according to a set of standardized categories; and thirdly to derive indices of the amount of illegal activity recorded per unit of patrolling effort This gives a "catch per effort" index of the quantity of illegal activity.

The system is based on two assumptions: firstly that patrol reports are reliable, and secondly that in any given set of conditions a consistent relationship exists between the real quantity of illegal activity and the catch per effort index. In this respect, the system has the same features and problems as strip census methods, and under ideal conditions could be used like them to calculate actual amounts of illegal activity. However, we emphasize that the primary purpose of law enforcement is deterrence of poachers, not generating data. The recording system must not detract from the performance of the patrol by adhering to strict sampling procedures. This limits the precision of the system which provides broad indices rather than precise figures.

The first step is measuring patrolling effort. Firstly staff



Elephants, Malawi [Hugo Jachmann]

time is divided into categories according to likelihood of contacts with poachers i.e. base time, off time, placement time and effective patrol time.

Only the last category is used in calculating patrol effort, while the ratio of effective time to the other categories is a useful index of the efficiency and motivation of field staff. Effective time is defined as time spent on foot in the bush, away from roads and certain footpaths. The most useful measures of patrol effort are the number of effective patrol days and the distance patrolled.

We place great emphasis on the ability of patrol leaders to navigate and indicate patrol routes on a map. Special training in these techniques is required, and estimation of patrol distance is done by pacing if possible or by reconstruction and measurement of the route on a map. Accurate maps with many recognized place names are essential.

The second step is the recording of illegal activity encountered by patrols. We use a set of about 20 standardized categories including key animals killed (i.e. elephant, rhino etc), other animals killed, gunshots heard, armed groups seen, snares and traps, poachers' camps, sets of footprints, fish-