ON THE PROPOSED REINTRODUCTION OF SERVAL (*Felis serval*) INTO THE GREAT FISH RIVER RESERVE, EASTERN CAPE.

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Introduction:

Serval (*Felis serval*) occur throughout much of sub-Saharan Africa (Haltenorth & Diller 1977; Smithers 1978). However, although widespread they have relatively specific habitat requirements and tend to be confined to well watered areas with adequate cover in the form of tall grass, reeds or underbush (Smithers 1983). It is regarded as one of the most endangered large mammal species in the former Cape Province (Stuart 1981; Lloyd & Millar 1982), and in fact Stuart (1985) and Swanepoel (1988) consider it extinct as a viable species within the Eastern Cape. In the South African Red Data Book - Terrestrial Mammals (Smithers 1986) the serval is listed as Rare.

Persecution and habitat degradation are probably the two most important factors contributing to the extinction of serval in the Eastern Cape. They have been incorrectly blamed for livestock predation (Smithers 1986), and are frequently confused with other felid predators such as leopard *Panthera pardus*, African wild cat *Felis lybica*, black-footed cat *Felis nigripes*, genets *Genetta* spp. and even caracal *Felis caracal* (Coetzee 1979; Lloyd & Millar 1983; Stuart 1985). As such serval have been persecuted by owners of livestock. Injudicious burning and grazing transforms serval habitat and reduces the biomass of its prey species (Rowe-Rowe 1992). The situation may be exacerbated by the fact that the Eastern Cape represents the southern-most limit of a species relatively widespread in Africa, and as such is peripheral in terms of its natural distribution. This may have contributed the vulnerability of the species in the region, firstly because it represents marginal habitat, and secondly because the population would have had limited capacity to recolonise sites where local extinctions occurred. Finally, competitive displacement of serval by caracal may be an additional factor contributing to the decline of serval in the Eastern Cape (Stuart 1985).

In the absence of source populations from which areas of local extinction can be naturally recolonised, reintroduction is considered the only effective conservation measure for this species in the region (Stuart 1985). Reintroduction into its former range is also the protection measure, along with legal protection, proposed in the Red Data Book (Smithers 1986). Stuart (1985) goes on to mention the Andries Vosloo Kudu Reserve (north-east of

Grahamstown) as one of two conservation areas in the Cape suitable for the reintroduction of serval, the other being De Hoop Nature Reserve.

This report is a response to the request by Reserve Management staff of the Great Fish River Reserve (GFRR), which now incorporates the Andries Vosloo Kudu Reserve, for recommendations concerning the reintroduction of serval into the Reserve. As with most reintroductions into conservation areas, the first consideration should be the historical distribution of the species in the region. However, because habitats are dynamic and change with time and circumstances, historical distribution in itself is insufficient motivation for a species reintroduction and the ability of the present habitat to meet the requirements of the species, as well as the potential impacts both on other wildlife species and human activities, need to be considered. These issues are discussed below under the separate headings of historical occurrence, present habitat suitability and potential impacts of reintroducing serval.

Historical Occurrence:

Historically, serval occurred within the Eastern Cape (Anon. 1931; Skead 1987; Rookmaker 1989). According to Stuart (1985) it "was almost certainly restricted to the southern Cape coastal belt and only extended inland to the east of 24°" (Fig. 1). This distribution clearly incorporates the area of the GFRR. Additional confirmation comes

from a serval shot in Grahamstown in 1889 (Anon. 1931; Coetzee 1973).

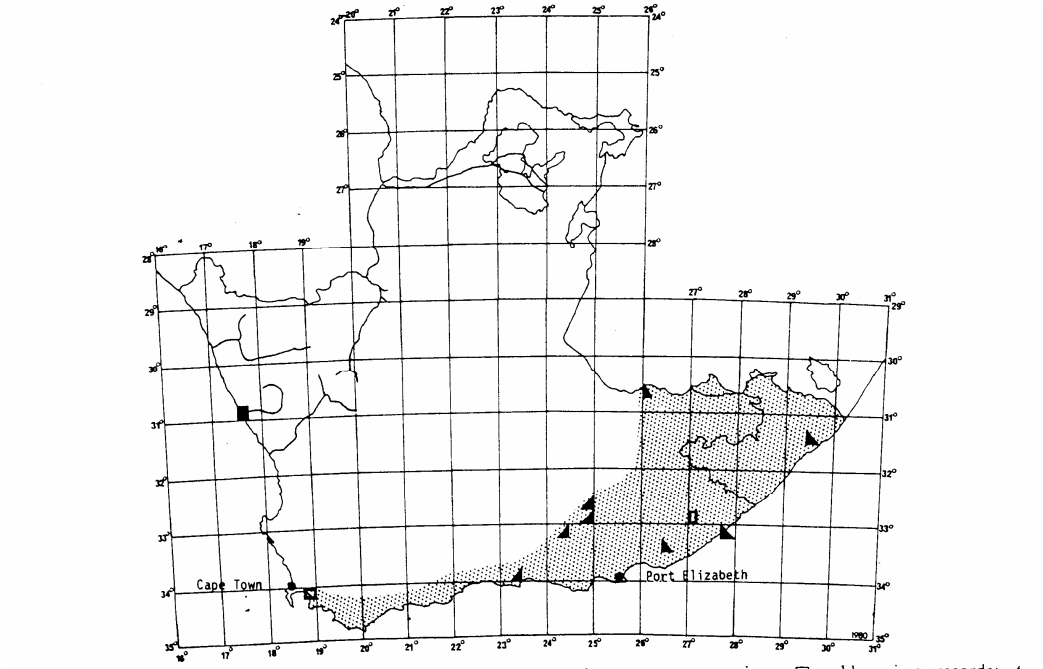

Fig. 1. The past and present distribution of *Felis serval* in the Cape Province. ■—recent specimen; □—old specimen records; ◢—confirmed farmer records; ◣—literature records. Stippled overlay indicates probable former distribution limit.

(from Stuart 1985).

Present Habitat Suitability:

Habitat suitability is typically evaluated in terms of its ability to meet a species' needs in respect of food, water, cover and shelter, as well as meeting the social requirements of the species. From a conservation perspective a suitable habitat should also be able to support at least a minimum viable population of the species in question.

In KwaZulu-Natal small mammals (rodents and shrews) accounted for more than 93% of the prey items consumed by serval, with birds, reptiles and insects making up most of the remaining 7% (Bowland & Perrin 1993). Although no data could be found for the Eastern Cape, the nature of the diet is confirmed by additional work done in Natal (Rowe-Rowe 1978) and in Zimbabwe (Smithers 1978). Vlei rats (*Otomys angoniensis* & *O. irroratus*) are the principle prey species (Smithers 1978; Bowland & Perrin 1993), which is indicative of the serval's affinity for vlei areas, mesic grasslands and savannah (De Graaff 1981). *O. irroratus* occurs in the region of the GFRR (De Graaff 1981; Swanepoel 1988).

Duiker (unknown sp.) and oribi (*Ourebia ourebi*) have been listed as prey species by Dorst & Dandelot (1970), however, Smithers (1978) is of the opinion that serval are incapable of tackling such large prey items.

In terms of water and shelter, the serval's association with mesic grassland has already been mentioned, and although they have been recorded from Eastern Cape forest as well as lowland and mountain fynbos (Stuart 1981); tall grass, thicket or adjacent hillsides appears to be important as sites to rest and seek refuge from disturbance (Rowe-Rowe 1978; Smithers 1978).

These habitat components are relatively common within the GFRR. However, it is not known to what degree the abundance and quality of serval habitat within the Great Fish River valley has changed since the period of its decline. What is known is that both commercial and communal grazing have substantially changed the structure of the thicket vegetation and animal communities on the boundaries of the GFRR relative to that of the Reserve (Fabricius & Burger 1996). It cannot said with any certainty just what the implications of this will be for a reintroduced population but the changes are not so drastic that the area is obviously unfavourable. In fact the shift to agriculture may have had a positive repercussion by opening up the closed thicket vegetation and increasing the density of rodents relative to undisturbed veld, bearing in mind that within the GFRR *O. irroratus* is associated with areas of rank grass and herbs between thickets (Perrin 1980).

The long-term viability of the reintroduced serval population will also depend on the size and structure of the founder population, the initial rate of population growth and the ultimate population size that the area and circumstances can support. The larger and more heterogenous the effective founder population, the greater the chances of the species establishing itself and surviving. Rapid initial population growth minimises the loss of genetic material associated with the reintroduction bottleneck. Once established a population is still exposed to the stochastic forces of extinction associated with environmental fluctuation, catastrophic events, natural variation in mortality and natality, genetic drift and inbreeding depression (Soulé 1987). The chances of a population going

extinct as a result of these is decreased where it is sufficiently large and resilient. In the absence of species and habitat specific research, the best estimate of a viable population is given by the so-called "50-500 rule" (Shaffer 1981; Simberloff 1988). Essentially this states that in order to reduce the risk of extinction due to demographic variation and inbreeding depression a population should comprise of at least 50 breeding individuals, and to minimise the threat of extinction due to loss of genetic fitness a population should consist of at least 500 breeding individuals. Of course these are very crude estimates and by no means a "rule", they do however serve as an indication of the orders of magnitude involved. Furthermore, many of the problems associated with small populations may be overcome by adopting a metapopulation approach to management (Hanski & Gilpin 1991), whereby discrete subpopulations are linked through the occasional exchange of individuals.

The apparently solitary, territorial nature of the serval (Estes 1991) suggests that it is largely intolerant of conspecifics, although home ranges do overlap. In what appears to be good serval habitat in KwaZulu-Natal, it occurs at a density of approximately one per 12.5 km^2, in partially overlapping home ranges of between 15-30 km^2 (Bowland 1990). This implies that to maintain a population of at least 20 breeding pairs in the Eastern Cape at least 500 km^2 of good serval habitat is required. Therefore, if the objective of the reintroduction exercise is to establish a self-sustaining population in the GFRR area, it is essential that it has the support of the neighbouring land owners.

Potential Impacts Of Reintroducing Serval:

Consideration must be given to the potential impacts of reintroducing serval into the GFRR on the genetic integrity of the serval and other related species, the potential prey species, potential competitors and neighbouring land users.

A single subspecies of serval, *F. serval serval*, is recognised in southern Africa (Smithers 1983; Meester *et al.* 1986). Furthermore, South Africa represents one end of the broad geographical range of the serval. This simplifies reintroductions and reduces the negative consequences of genetic admixture when populations do mix. Introducing animals from another southern African population should therefore be acceptable.

The serval is capable of hybridizing with the African wild cat (*F. lybica*) (Smithers 1978) which occurs widely in the Eastern Cape (Stuart 1981; Swanepoel 1988) and which shares an affinity for riverine areas. However both species occured sympatrically in the past and provided their populations are not artificially contained or manipulated (*e.g.* sex ratios skewed), they should co-exist without detrimental effect. The reproductive viability of hybrid offspring is not known.

As already mentioned, serval are primarily rodent and bird predator specialists, and these prey types are not restricted by the boundaries of a conservation area. As such they should be able to absorb the impact of serval predation on condition that serval densities do not get artificially high (*i.e.* the serval are able to disperse naturally). The impact of reintroducing serval on antelope species is expected to be minimal (Smithers 1986).

There are close similarities in the feeding behaviour of serval and caracal (Smithers 1978), however, the caracal is the more versatile of the two and so it is unlikely that the reintroduction of serval will have a significant negative impact on the caracal population. As already mentioned, competition with caracal may be one of the reasons for the original decline in serval numbers in the Eastern Cape. The fact that the caracal have remained in the area once the serval were effectively extinct, may have provided an opportunity for caracal to expand its resource base, pre-empting the niche of serval, thus complicating the chances of serval re-establishing themselves.

The reintroduction of serval into the GFR Complex is in keeping with the management objectives for the complex (ECNC 1995), however it is to be expected that neighbouring land owners will be apprehensive. Bowland (1990) found no evidence of sheep in the diet of serval, despite the fact that this study incorporated land grazed with sheep. Smithers (1983) notes that serval are known to prey on livestock up to the size of peacock, and although they will take free-range poultry they are deterred by wire netting and make no attempt to get through it. Furthermore, although they do not readily feed on carrion, serval which have killed poultry tend to return, and as such it is a relatively simple exercise to

capture the culprit without needing to exterminate the population (Smithers 1983). Furthermore, serval are apparently easy to hunt, particularly with dogs (Stuart 1985). Their potential for predation on domestic stock is restricted to poultry and this in itself should be controllable. It does not appear, therefore, that serval will pose a real threat to the livelihood of landowners in the vicinity of the GFR Complex. However, unless an effort is made to enlist the support of neighbours, persecution can be expected to remain a problem to the species, and the re-establishment will be confined to the conservation area. This will have a negative effect on the vigor and resilience of the population, and will compromise the chances of a successful reintroduction of serval to the Eastern Cape.

Conclusion:

Griffith *et al.* (1989) reviewed programmes to establish new bird and animal populations in the wild, and arrived at the following generalisations. The chances of an establishment programme being successful are:

1. greater for abundant than for threatened species;
2. greater for species released into excellent quality habitat than species released into marginal habitat;
3. greater within areas of historical occurrence than outside such areas;
4. greater for wild caught than captive bred animals;
5. greater for herbivores than carnivores.

By implication the reintroduction of serval into the GFRR has a mixed chance of success. None the less, the habitat appears to be suitable, and the chances of re-establishment may be improved by enlisting the support of neighbouring land owners, thereby reducing the threat of persecution and making as much habitat available as possible. This will also allow the establishment of a viable and self- sustaining population in the Eastern Cape.

Recommendations:

The likelihood that the reintroduction of serval into the GFR Complex will succeed is sufficiently high to justify serious consideration. Furthermore, from a conservation perspective, the benefits of the successful re-establishment of serval in the Eastern Cape must outway the costs of a failure. Therefore, it is recommended that:

1. **the reintroduction of serval into the Great Fish River Reserve be attempted;**
2. **the reintroduction be done with the knowledge and full support of the neighbouring land owners;**
3. **every effort be made to acquire the full compliment of 18 animals offered by Maholoholo Game Reserve for the founder population;**
4. **the population growth rate be monitored and if it is slow (*c.* <20% per annum over a five year period) more animals be reintroduced;**
5. **a metapopulation approach to the management of serval be adopted, requiring occasional supplementation with new animals, the amount and frequency of which will depend on the size and growth rate of the population.**

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