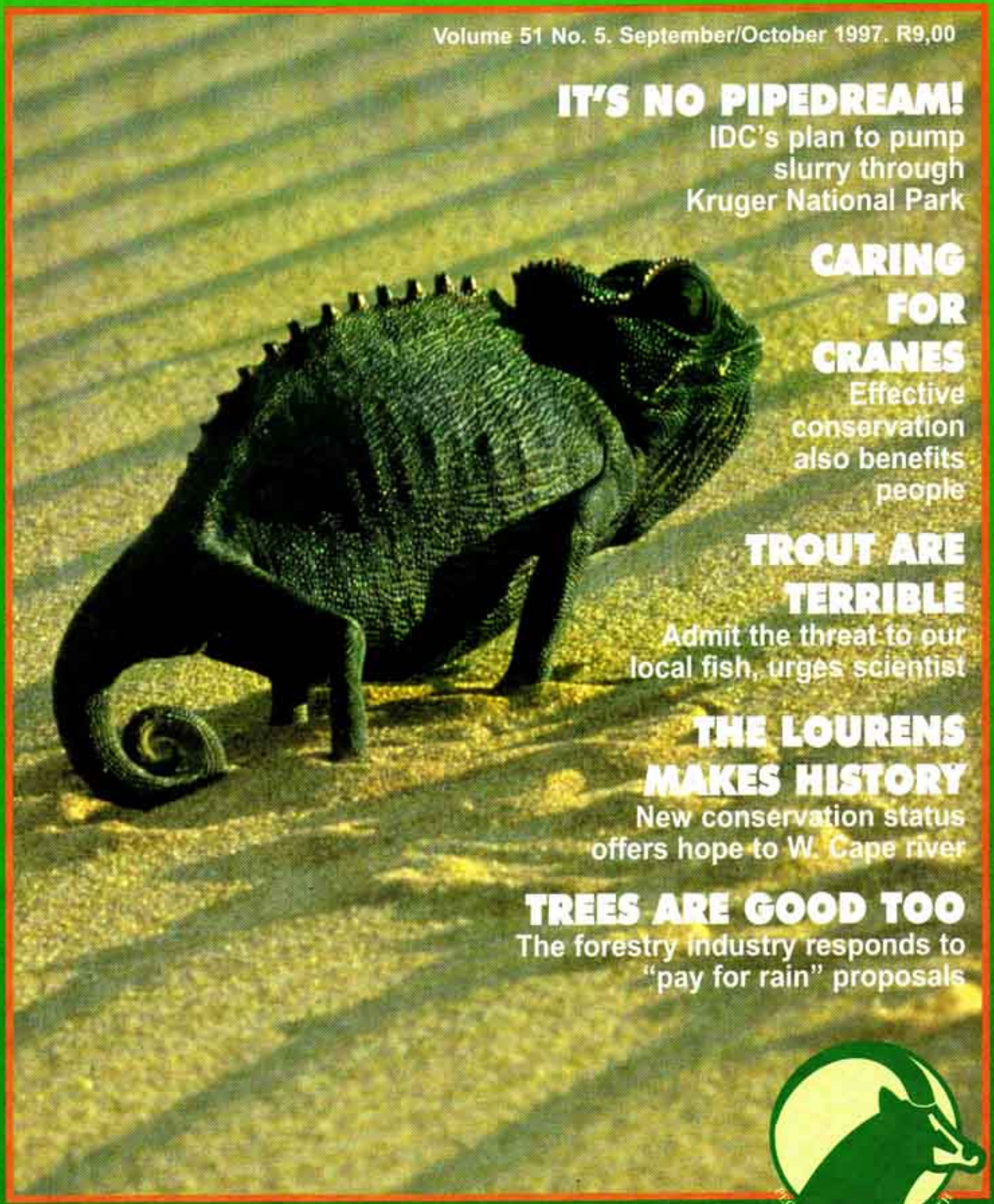
African WILDLIFE

YOUR VOICE FOR CONSERVATION

Volume 51 No. 5. September/October 1997. R9,00



IT'S NO PIPEDREAM!
IDC's plan to pump slurry through Kruger National Park

CARING FOR CRANES
Effective conservation also benefits people

TROUT ARE TERRIBLE
Admit the threat to our local fish, urges scientist

THE LOURENS MAKES HISTORY
New conservation status offers hope to W. Cape river

TREES ARE GOOD TOO
The forestry industry responds to "pay for rain" proposals

PEOPLE CARING FOR THE EARTH

JOURNAL OF THE WILDLIFE AND ENVIRONMENT SOCIETY OF SA

EMOTION PREVAILS OVER SCIENCE

Animal translocations in southern Africa can be a problem

A consignment of reptiles and arachnids, in transit from Mozambique to the USA, recently made headlines when it was confiscated at Johannesburg International Airport by the Society for the Prevention of Cruelty to Animals (SPCA). Although the required permits appeared to be in order, a number of the animals had died or were inappropriately packed (according to the SPCA). This negligence led to the confiscation by the SPCA. Part of the consignment consisted of spiders and scorpions. After the necessary legal steps, the SPCA obtained possession of the animals and, after consultation with experts (including Mpumalanga Nature Conservation), the spiders and scorpions were released in the vicinity of Hoedspruit. The rationale was that the same species were recorded from the area, and therefore they were native to the area. This event was soon followed by the release of hundreds of reptiles (supposedly collected in Mozambique) in Zimbabwe. Southern Africa's leading expert on reptiles, based in Zimbabwe, was not consulted regarding the release. Many of the lizards were flat lizards (*Platysaurus* spp.), a genus of rock-dwelling lizards that are thought to be poor dispersers, possibly limiting their breeding opportunity to isolated populations.

The commercial collection of reptiles (and other animals) is a disturbing and rapidly-growing problem, especially in developing countries where collection and export permits are easily obtained by the greasing of a palm (this is not to infer that this was the case in Mozambique). Obviously, from a conservation perspective, these animals are removed from their role as a vital link in a community or ecosystem. Also, there is frequently permanent destruction of habitat. For example, a crowbar may be used to extricate a small gecko or flat lizard from an exfoliating rock flake that normally serves as a refuge.

However, a new problem emerges with the confiscation of animal shipments: what to do with them? In these situations, individuals or organisations with conflicting interests become involved, often playing on public sympathy.

The subsequent release of the confiscated reptiles in Zimbabwe was featured on the SABC television programme 50/50. It was stated that the whole exercise could be considered a blueprint for future translocations. I maintain such thinking is flawed; it appears to be based on emotion, and ignores a wealth of scientific knowledge and expertise, as well as important lessons from history.

Translocation – broadly defined as when an animal is moved from one location to another, and encompassing relocation, repatriation, introduction, reintroduction and augmentation – is a conservation strategy that has recently come under scrutiny, mainly because the same problems that plague natural populations impede newly-bolstered populations. As a consequence, the success rate of these projects is often low. A study published in 1989 cited a 44 per cent success rate for mammal and bird translocation programmes, world-wide. A success rate of 19 per cent was published in 1991 for amphibians and reptiles. In South Africa, a study published in 1994 reported a success rate of 53 per cent for ungulate translocations in national parks. The success rate of these strategies is thought to be dependent on a variety of environmental and genetic factors. However, the release of spiders and scorpions near Hoedspruit and reptiles in Zimbabwe appeared to be motivated more by "humanitarian" than conservation concerns. I am concerned about the possible effect of such "humanitarian" releases on local populations and ecosystems, as opposed to the survival of the released animals. In particular, if non-threatened species are involved, is translocation a viable option at the risk of adversely affecting established local populations and ecosystems?

Science's understanding of speciation, and what a species is, has led to the identification of many cryptic species (species that may look identical, but differ significantly enough genetically to warrant recognition as full species).

One of the lizards confiscated by the SPCA at Johannesburg International Airport recently. The reptiles, apparently from Mozambique, were released in Zimbabwe in a move that has been questioned by conservationists.

text & photos by Martin J. Whiting

For example, a recent study by Richard Highton on a group of North American salamanders revealed that a single species complex was actually composed of 16 species! Many more species are out there than is immediately apparent, and molecular techniques are often necessary to elucidate species boundaries. Therefore, care must be taken during translocation to ensure that "novel" species are not introduced into an area. Also, there is often considerable geographic variation within a species that may or may not be expressed by an animal's appearance. This may be the result of genetic drift (changes in gene frequency in small populations due to chance fluctuations) or selective forces (for example, natural selection). By translocating animals from one part of a species' range to another, you are allowing genetic exchange to take place that would otherwise not. If the populations are genetically divergent, deleterious genetic effects may result from allowing genetic exchange. This is termed outbreeding depression and the end result is a reduction in fitness (reproductive success).

One of the confiscated flat lizards from Mozambique. Biologists are suggesting that the reptiles' subsequent release in Zimbabwe could have an impact on local populations.

If you consider two populations of the same species that are geographically distant and experience slightly different environmental conditions, they may have different co-adapted gene complexes as a result of local adaptation. By allowing genetic exchange, these complexes may be broken up through hybridization and result in lower fitness. Numerous studies have documented this effect for a variety of animals, including insects. One of the best known examples comes from Europe. When the ibex *Capra ibex ibex* became extinct in Czechoslovakia through over-hunting, ibex were successfully translocated from neighbouring Austria. Some years later two other subspecies of ibex were translocated to the same herd, from Turkey and Sinai. The result was fertile hybrids that rutted in autumn instead of winter, thereby producing offspring in the coldest part of the year. The unfortunate outcome was the population's extinction.

Other negative effects of translocation include aberrant behavioural patterns displayed by released individuals compared to natives, competitive (ecological) effects on native species, initiation of hybrid populations (that may compete with local populations with low genetic variation), disease transmission, and increased incidence of disease due to the stress of translocation. Aberrant behaviour or social dysfunction may be especially problematic for group foragers or species that form breeding congregations. Social dysfunction is thought to have contributed to the extinction of the Carolina parakeet, the passenger pigeon, and the heath hen in the USA. Examples of negative ecological effects due to translocations are numerous. One well-documented translocated species heavily impacting local fauna is the North American bullfrog.

Little is known about disease transmission in reptiles and arthropods such as spiders and scorpions, and this may not be a concern, but it is worthy of mention because it has been documented for other organisms involved in translocations. In the case of the North American desert tortoise, a species frequently translocated, highly contagious upper respiratory disease syndrome was at least partially responsible for federal protection of populations in the western Mojave Desert. Also, beavers translocated to the Netherlands suffered high mortality from infectious diseases brought on by the stress of translocation.

Traditionally, translocations have been perceived by the general public (and some conservationists) as successful and "humane" conservation strategies. Although there are certainly many success stories, they are exceeded by the number of failures. Much of this is due to a lack of understanding of the complexity of factors influencing an organism's success in a particular environment. The possible deleterious effects of such translocations must always be considered before implementation of a translocation programme. In the case of critically endangered species, decisions may have to be made with a minimal amount of data and may require a certain amount of intuition. In those situations, if translocation success is low, it may still be argued that some success may still be beneficial to native populations. However, this should not be the case for non-threatened species where the possible long-term effects on an ecosystem or local population should outweigh the well-being of a "relatively" small number of displaced individuals. In the absence of opportunities to return such animals to their places of origin, maintaining them in captivity for education purposes and preventing further breeding may be preferable.

Translocations should be carried out by qualified scientists following a standard protocol. (Translocation guidelines have been published in peer reviewed scientific publications.) At a minimum, such a protocol should include meticulous documentation of the sex, condition, date of release, and origin of all animals involved in the translocation. If possible, individuals should be tagged, thereby allowing measurement of survival. Provision must be made for a thorough risk assessment prior to translocation, as well as a monitoring programme subsequent to release. Prior to release, limiting factors should be identified and controlled for. Predictive models for translocation success based on limiting factors have been developed, and could be informative in evaluating the potential success of a translocation. Such a protocol would not only increase the likelihood of a successful translocation, but in unsuccessful attempts, may shed light on the causes of failure. Understanding the factors associated with failed translocations has been hampered by a lack of monitoring programmes.

Translocations will in most cases have an effect (generally negative) on the native populations into which the organisms are released. Therefore, a planning stage preceeding translocation is imperative. In this sense the equivalent of an environmental impact assessment (EIA) is required before good justification could be offered for translocating wild animals or plants. The Environmental Conservation Act (with recent draft amendments) could be used to provide guidelines that would place translocations in the realm of such environmental impact assessments. The translocation of wildlife needs to be added to the list of activities requiring EIA according to the above-mentioned Act. This would encourage group decision-making and the consultation of outside experts. In an era of global environmental instability and species mass extinction, the formulation of a sound protocol for translocations is critical, and implementation of the Environmental Act could play a major role in achieving this end. ■

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