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The last Knysna elephant has an urgent message for the world

● She is the metaphor for our treatment of all species

Heather Dugmore

Only one elephant remains in the Knysna forest and surrounding fynbos: a mature female. There is enormous pathos and tragedy in this finding as she is the last truly wild, free-roaming elephant in SA and the southernmost in the world.

The finding was recently published in a scientific article titled *And Then There Was One* by leading mammal scientists, following a rigorous camera trap survey using 72 passive infrared-triggered cameras, 24/7 from July 2016 to October 2017 in the Knysna elephant range that spans 185km².

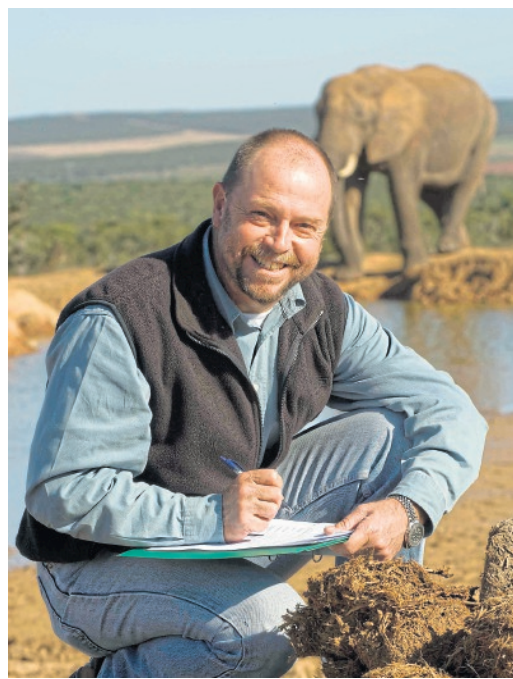
This range includes the Garden Route National Park, privately owned commercial timber plantations and privately owned forested land.

The Knysna elephants have always moved directionally and seasonally along clearly defined pathways between feeding patches and water in the area.

"There has been a debate for years now about how many Knysna elephants there are, as they are difficult to see or locate," says Graham Kerley from the Centre for African Conservation Ecology at Nelson Mandela University, one of the renowned mammal researchers who participated in the research and co-authored the article. "To have it confirmed that there is only one Knysna elephant left is a shock to many as there is a deep aura of mystique and mythology around them, fuelled by their elusiveness and by stories like Dalene Matthee's *Circles in a Forest*."

To conduct the survey, the 72 cameras were deployed at 38 locations within the elephant range and set to take high-quality images with a one-second interval between sequential photographs, and a two-second delay between video clips. They were fastened to trees within 1m of elephant-used roads and paths, at a height of between 1m and 1.5m.

Recent technological



At close quarters: Prof. Graham Kerley from the Centre for African Conservation Ecology conducts elephant research at Addo Elephant National Park in the Eastern Cape. /Nelson Mandela University



Deadly harvest: Maj PJ Pretorius conducted the last known legal hunt of Knysna elephants in 1920. /Forestry SA

improvements in camera-trap technology make it a widely used, reliable application in ecological studies.

"The cameras were all active for 15 months and covered the range evenly during this time, ensuring there were no gap areas where elephants might reside undetected," says SANParks scientist Lizette Moolman, one of the researchers who worked on the study. Over a period of 17,306 active camera trapping days, a total of 5,195 elephant photographs or video clips (15 to

30 seconds each) were captured, in 144 capture events. All of these solely identified one heavy, round-bodied adult female with a highly wrinkled forehead that forms a unique, easily identified pattern.

"She is about 45 years old and moves in the indigenous forest and fynbos areas on SANParks and neighbouring private land," says Moolman.

Elephants have unique individual physical features such as ear notch patterns and tusk shape and size, making them individually identifiable. In



On her own: The only surviving Knysna elephant is a female of about 45 years. Her image was snapped during a survey using 72 cameras at 38 locations within the elephant range. /SANParks

addition to this female's shape and forehead, she has unique serrated ear notch patterns and relatively wide-spaced asymmetrical unbroken tusks, the left higher than the right.

"The brutal reality is there is no longer a population of Knysna elephants. All the mystique of the Knysna elephant is reduced to a single elephant left in rather tragic circumstances," says Kerley.

Female elephants are not meant to be alone – they spend their lives in family units of related adult females with their calves. The images reveal that although she is a fully mature adult female, she lacks developed breasts, because she is neither pregnant nor lactating. Her shrivelled mammary glands suggest that she has not had a calf in a long time, if ever.

Kerley says she appears to

be in reasonably good condition with the exception of her swollen temporal glands with excessive temporal streaming, which suggests that she is experiencing stress, possibly as a result of being alone.

"Considering all these factors, the debate about how we have allowed this population to go functionally extinct and how to manage the last elephant is very emotional and very serious as she is a symbol of how we are treating biodiversity as a whole," he says.

"It is a societal responsibility as we have forced these elephants, which are savanna elephants, into inhospitable forest habitats as a result of hundreds of years of hunting them and chasing them out of their natural habitat."

The leaves of the Knysna forest trees are low in protein

and high in fibre – a poor-quality food. Most of the forest canopy is 30m–40m high, and out of browsing reach. By deduction, the Knysna elephants supplemented their diet on the forest edge and in the fynbos.

Historically, the Knysna elephants roamed in their thousands as a continuous population for hundreds of kilometres along the southern Cape coast. They had access to thickets, fynbos and Karoo habitat. Over the past 300-odd years they were forced, as a result of persecution and human encroachment, to retreat into the forest as a refuge population.

By 1876, as a result of hunting and persecution, the thousands of southern Cape and Knysna elephants were down to 400 to 500 animals,

according to the official reports of conservators of forests.

In 1920, Maj PJ Pretorius conducted the last-known legal hunt of Knysna elephants. He had a permit to kill one elephant, but five died in the process, reducing the elephants to about 13. By 1970 they were down to 11 (Wildlife Society survey); by 1981 down to three (forestry department records).

In 2007 a faecal DNA genotyping survey suggested an increase to five female elephants, a calf and a breeding male, but this kind of survey only provides statistical estimates of population size, not an actual count, which the camera survey does. Rigorous follow-up counts have been neglected, and we are now down to one. She could live to 65 years, as elephants do, and she could be in the forest for

another 20 years, or not, we just don't know.

"Managing her is a huge challenge because she is very shy and avoids humans," Kerley says. "It is not viable to introduce savanna elephants from other populations – from Addo or Kruger – to the forest. This was tried with three young Kruger elephants in September 1994 and it failed. In less than a month, one died of stress-related pneumonia. The other two left the forest causing human-elephant conflict and they ultimately had to be moved to Shamwari Game Reserve.

"The last Knysna elephant has the same genetics as the Addo and Kruger populations and so the question has been raised whether she should be moved out of the forest to a herd. The option of capturing her and moving her somewhere else would be dangerous for her and we don't know if it would even be of any value to her as she only knows the forest and she might not be able to settle into another area with other elephants."

The same goes for any attempts at artificial insemination. It's too risky and it was decided to attempt the "impregnation" route, it would be better to move her to another elephant population, which, Kerley says, could be too traumatic for her.

He says a major voice that needs to be considered in the decision about her management is the people of Knysna – who, in all probability, would not want to see her go. "It comes down to a societal decision as it is no longer a population decision, it is about the last Knysna elephant's well-being. My personal opinion is that we should leave her be.

"Hopefully we humans have learnt a nasty lesson because it is ultimately our fault that we are down to the last elephant here. She is the metaphor for our treatment of all species that live on this planet with us.

"The saying 'the elephant in the room' could not be more apt; she is telling us we are making some big mistakes and we are going to lose a lot more than her if we don't substantially change how we treat and value biodiversity."

ACCESS TO RESOURCES

Poor people face biggest climate-change health risks

Lenore Manderson

Evidence of the effects of climate change on human habitat and health, on plant and animal life, on water resources and shorelines is mounting. These changes are felt unevenly within and between nations and communities. This is due to differences in access to resources, infrastructure, social structure and policy.

Climate change is, and will continue to be, most severely felt by the poorest people in any population, particularly those in poorly resourced, isolated and extreme environments.

But extreme weather events, famine and epidemics are not how people most commonly experience climate change. Rather, the unprecedented peaks in temperature across the world affect the conditions of everyday life in subtle ways.

This is particularly true among those with the fewest resources. For example, people who live in poorly constructed

houses and shacks, often without ventilation, and in old inner-city dwellings, are at heightened risk of heat-stress health problems that can be fatal. These include dehydration, heat stroke and asthma.

In Africa, people living in cramped housing in informal settlements, and those in run-down inner-city apartments, are most at risk. And, where there is no ready access to potable water, their health is at even greater risk.

The effect of global warming on health conditions and deaths is the hardest to predict. But researchers are beginning to identify the biggest potential risks, particularly for developing countries. Developed economies are able to reduce environmental health risks through improved infrastructure, legal interventions and education. But the poorest populations, with the least political traction, remain vulnerable. Global warming simply adds to their health risks.

A few examples illustrate

how changes in weather patterns can have a negative effect on the world's ability to manage diseases.

For example, in the absence of a vaccine, infectious diseases such as malaria have largely been controlled by managing the environment better.

But this is complicated by changes in ambient temperature, temperature ranges, changes in precipitation, and water flow.

CLIMATE CHANGE

All affect the geographic habitat and behaviour of vectors, such as mosquitoes and snails. This, in turn, is making it harder to deal with infections such as malaria, dengue and schistosomiasis (bilharzia).

Additionally, changes in rainfall patterns and increased drought are likely to affect water supply. Lack of water for household use and personal consumption affects hygiene and sanitation, contributing to the risk of waterborne diseases such as dysentery.

Again, people who don't

have ready access to running water, and those who live in run-down and crowded accommodation, are especially at risk. Changes in water supply can also affect commercial food and subsistence production. This, in turn, affects food security and the price of food.

Social, economic and structural factors also shape health risks, worsening environmental exposure and risk factors in health and illness. This is particularly true in Africa, where many of the top 10 causes of death are linked to the environment.

In 2016, the World Health Organisation (WHO) associated most of the top 10 causes of death with physical work and social environments.

How this unfolds is particularly clear if we look at SA statistics on the top 10 diseases affecting the country.

One of them is diabetes. The disease is strongly linked to nutrition, food availability and affordability. This means that, in most populations that have become dependent on



Tapping into health: Access to water and sanitation will help to mitigate some of the health risks posed by climate change. /Bloomberg

purchased food, diabetes tracks poverty. A range of diseases are closely associated with diabetes and share strong links to diet and nutrition.

These include hypertensive diseases, cerebrovascular diseases, and ischaemic heart disease, including heart attacks.

Influenza, pneumonia and TB are also in the top 10. All are airborne infections, with the risk of these conditions highest

among the very young, old and people with HIV or other immune-mediated conditions. For its part, TB spreads most readily in closed environments.

Chronic lower respiratory diseases include chronic bronchitis, emphysema and asthma and occur as a result of toxins, chronic infection and inflammation. Cigarette smoke is the primary factor, but industrial pollution and

occupational health hazards contribute to this toll.

Many of these conditions are linked to the environment in a very direct way.

Water, sanitation, crowding and poor ventilation, and indoor and outdoor air pollution – from cooking and heating, manufacturing, and the use of fossil fuels in transport – all contribute to continued high rates of lower respiratory

infections and diarrhoeal diseases and lung cancer.

The WHO draws attention to decreased exposure to environmental health risks as socioeconomic development increases. But we cannot wait for this to be resolved without active steps being made.

Financial resources, research and development through collaborations with universities and corporations have been set aside to develop new, affordable technologies to diagnose disease and to develop drugs to intercept the development of the disease.

While these investments will continue, more urgently needs to be done.

To reduce deaths and disease associated with climate change, governments and communities must address global warming. **This article was originally published by The Conversation Africa**

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