

23 October 2010 Last updated at 16:57 GMT

Elephant ecological engineering 'benefits amphibians'

By Mark Kinver Science and environment reporter, BBC News



Elephants can create

more complex habitats that can support more biodiversity

Areas heavily damaged by elephants are home to more species of amphibians and reptiles than areas where the beasts are excluded, a study has suggested.

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US scientists recorded 18 species in high damage areas but just eight species in unaffected habitats.

Elephants are described as "ecological engineers" because they create and maintain ecosystems by physically changing habitats.

The findings have been [published in the African Journal of Ecology](#).

"Elephants, along with a number of other species, are considered to be ecological engineers because their activities modify the habitat in a way that affects many other species," explained Bruce Schulte, now based at Western Kentucky University, US.



"They will do everything from digging with their front legs, pulling up grass to knocking down big trees. So they actually change the shape of the landscape."

He added that elephants' digestive system was not very good at processing many of the seeds that they eat.

"As the faeces are also a great fertiliser, the elephants are also able to rejuvenate the landscape by transporting seeds elsewhere," Dr Schulte told BBC News.

The team from Georgia Southern University, US, carried out its study in Ndarakwai Ranch, a 4,300-hectare site of mixed savannah woodlands (dominated by two *Acacia* species) and open savannah in North-East Tanzania, between August 2007 and February 2008.

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HABITAT DAMAGE CATEGORIES

- **High** - main trunk pushed over and/or uprooted
- **Medium** - damage to the main trunk (not pushed over) and more than 50% of branches and foliage damaged
- **Low** - no damage to the main trunk and minimal damage to branches and foliage

They identified areas that experienced high, medium and low damage from free-ranging elephants, which were compared with a 250-hectare undisturbed area that was fenced off to protect it from large herbivores, such as elephants, giraffes, zebra and elands.

When sampling for species richness and abundance, the researchers found "a trend towards greater richness in areas with more elephant damage to the woody vegetation".

Frogs' best friend

They wrote: "Eighteen herpetofaunal (amphibians and reptiles) species... were sampled in areas of high elephant damage. Medium damage areas were comprised of 12 species, while areas of low damage had 11 species.



The study's findings could affect the way

certain habitats are managed in the future

"The control site (fenced area) had the lowest species richness with only eight species."

In the paper, the scientists concluded that difference in abundance and species richness in the damaged areas was probably a result of engineering by elephants, generating new habitats for a diverse array of frog species.

"Craters and coarse woody debris formed by uprooted and broken trees [increased] the number of refuges against predators," they observed

They added that the locations were also favoured by insects, which were an important food source for amphibians and reptiles.

"Therefore, the abundance and diversity of prey may be important factor that attracted these species of herpetofauna to elephant modified areas."

Dr Shulte explained the team decided to carry out the study in order to identify effective indicator species that offered an insight into the health of the region's environment.

"In a landscape, such as the African savannah, birds can just leave if things are not so good," he told BBC News.

"Amphibians and reptiles tend to be sensitive to habitat change, and many of them are limited in terms of how far they can go in a relatively short space of time to escape problems."

He added that the findings had implications for habitat and wildlife management strategies.

"if we are managing habitat, then we clearly have to know what we are managing it for.

"What this study point towards is that although things may not look particularly pretty to a human eye does not necessarily mean that it is detrimental to all the life that is there."