

**RA**  
AWARE

CONSERVATION & PHOTOGRAPHY  
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**The Secretary  
Bird: Threatened  
Snake Boxer**

By Peter Hudson  
with Mary Fick

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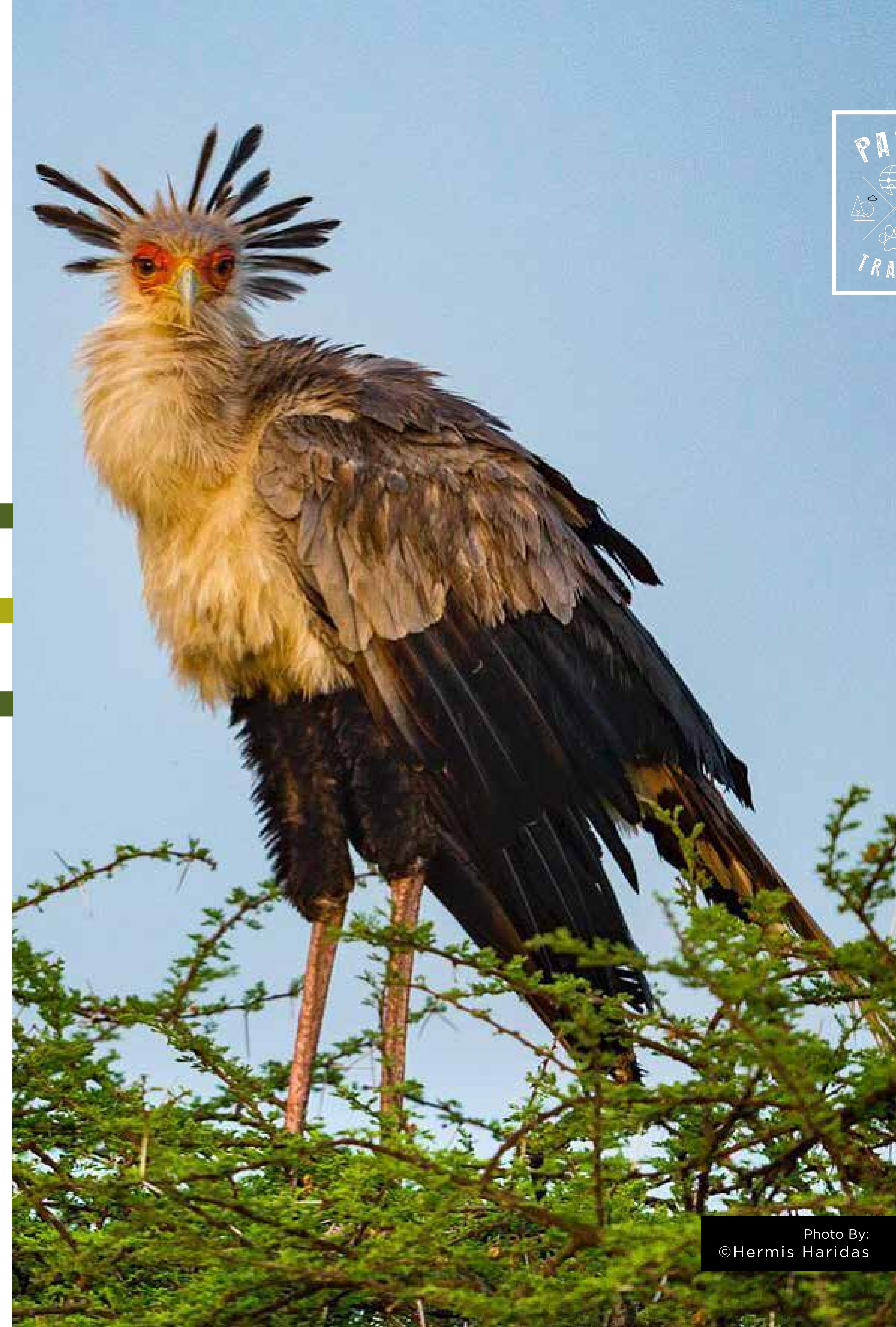
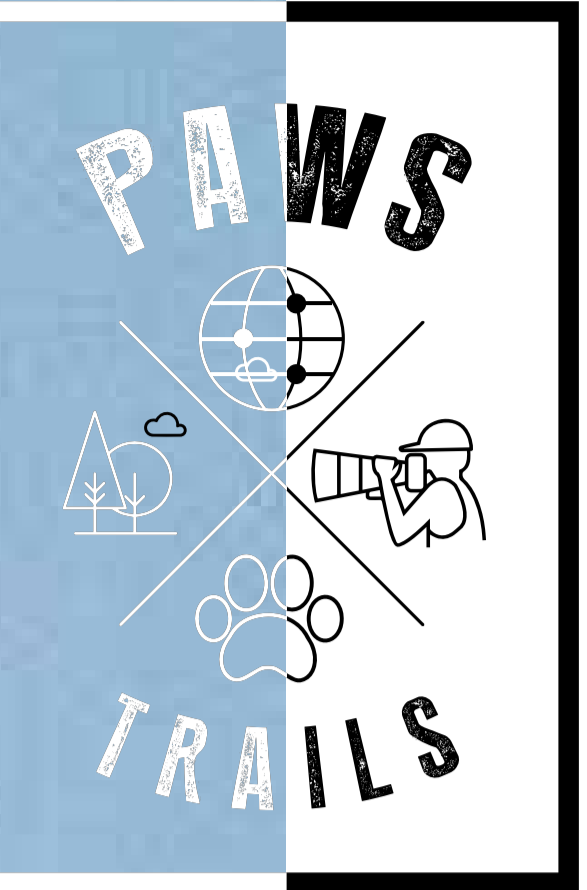


Photo By:  
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Raghul Patteri  
Editor

In this edition of PT Aware, we chronicle a bird that is one of a kind. The secretary bird is an intriguing being both in appearance and character. The intriguing look of the bird had given rise to many theories on the origin of its name. It is equally peculiar for its feeding habits, has to be when you are known as an expert snake catcher.

The biology of this bird has evolved to hunt down prey on feet, its tall legs are not only helpful in running down prey, but also to deliver the sucker punch to finish it off. It is imperative that such a unique creature be protected to ensure its survival. Losing a bird like this is akin to losing a link in the evolutionary chain.

Unfortunately, even these birds are threatened by habitat loss and the destruction of feeding grounds. Join Dr. Peter Hudson to learn more about the Secretary bird.

PT Aware brings you amazing species from around the globe and their conservation issues. We are thankful as ever for our marvelous photographer friends who contribute their hard-earned images to help us tell these stories.

We are proud to associate with so many passionate scientists, conservationists, and photographers from around the world and we stand by every attempt to protect our ecology and fellow beings.

Our next edition will chronicle the Zebra. Please be ready with your Zebra photographs.



Photo by: Noushadali Edakkandathil

EDITOR'S DEN

# FOUNDERS' NOTE

Welcome to this edition of PT Aware.

It feels good to chronicle a lesser known, but yet charismatic bird species from Africa. The secretary bird has intrigued explorers with its looks, biology, and feeding habits. For photographers it is always exciting to capture intriguing species and the secretary bird surely makes for some amazing portraits.

Encroachment by humans and habitat destruction are major causes of species decline around the world as is the case with the Secretary bird. Everyone should pay more attention to leave a smaller footprint on our ecology. Living responsibly should be a mantra that we impart to our children and show them through our own actions. Being a little less materialistic and choosing sustainably produced products are today possible. Proper utilization of resources with minimal wastage was a virtue that our older generations had which the last two generations have largely seem to lose. It is high time we start more responsible to mother earth and our fellow beings.

Thanks to each of our photographer friends who help us spread the gospel of conservation. We eagerly await your photographs, and it is an enjoyable experience to be able to enjoy such marvelous art.

**Hermis Haridas & Nisha  
Purushothaman**

Founders - Paws Trails Explorers



THE STORY

# The Secretary bird: Threatened snake boxer

By Peter Hudson  
Conservation Director, Paws Trails

with Mary Fick,

Images by: Peter Hudson, Hermis Haridas, Nili Gudhka, Rino Suren, Kalika Shah, Sekhar Kiran Krishnanah, Shyam Mohan, Sibin Nelson, and Noushadali Edakkandathil and Nisha Purushothaman, sibin Nelson and Noushadali Edakkandathil.





Canon  
IMAGING PARTNER

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**Peter Hudson is a scientist, photographer and conservationist. He undertook his first scientific expedition to Africa at the age of 21 and has been a regular visitor ever since. Passionate about nature, he manages his own 36-hectare nature reserve in Pennsylvania which is home to bears, bobcats and other animals.**

In his professional career, Peter is the Willaman Professor of Biology at Penn State University. The focus of his research has been the infectious diseases of wildlife and in particular how new diseases emerge. For the past 11 years he has been working on how and why viruses move from bats to humans in an attempt to predict when viral spillover occurs. He has also been studying the wolves in Yellowstone, tortoises in the Mojave Desert and bighorn sheep in Idaho.

**Peter is the Conservation Director at Paws Trails and uses his skills as a scientist and educator to increase awareness about conservation issues. He is supported by two interns at Paws Trails: Hayden Kissel and Shreya Menon. He is also heavily involved with the Random Good Foundation that undertakes story telling for social change. He is an adjunct Professor at The Nelson Mandela African Institute of Science and Technology based in Arusha, Tanzania and a Fellow of the Royal Society.**

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I think we can learn more from studying the oddities in life than by simply examining the average and perhaps boring cases. The secretary bird (*Sagittarius serpentarius*) is truly one of those oddities, the only species in a whole taxonomic family of birds compared to a group like the pigeons which has 348 species or the pheasants with 181 species, or the 352 hummingbird species. Having said that monotypic families like this are not uncommon amongst the birds, for example the ostrich, osprey and sunbittern have just one species in each family. Initially, taxonomists assumed that the secretary bird with its long striding legs, soft footfall and a hurried but delicate demeanor must surely be closely related to the cranes. However, subsequent morphological and genetic analysis places this species smack in amongst the diurnal raptors. The secretary bird family sits between the osprey family and the diurnal raptor family that includes the 250 species of hawk, eagle, and kite.

The cause of this confusion, no doubt arose because the secretary bird exhibits parallel evolution. It has evolved to live in the African savannah lands where it feeds on snakes, lizards, large insects, and small mammals. To do this it needs to be long-legged, tall, and fast to see the prey and chase it down. A taller bird is a heavier bird so even though the secretary bird is very light for its size, it still has difficulty and must run hard to get sufficient lift for flight. As such it is

energetically economical just to chase the prey down rather than fly at it. This is a very similar feeding behavior to that observed amongst the cranes and bustards, hence they look somewhat similar, and I guess you could easily mistake the secretary bird as a crane, unless you stop and examine the skull and bill, then you would know it was indeed a raptor.

The most popular derivation of the secretary bird's name is that the feathers sticking out behind the bird's head reminded 19th-century Europeans of the quill pens that secretaries then tucked behind their ears. More recently the etymologists have been arguing about it and a new suggestion is that the name derives from the Arabic 'saqr-et-tair', which means 'hunter bird'. This fits of course and reflects the Latin name of *Sagittarius*, that in astrology also means the hunter. I suspect the former explanation will dominate although at the end of the day, the bird is still rather unique.

#### **Long legs and venomous snakes**

One clear difference between the secretary birds and the cranes is that the cranes use their bill to catch prey while the secretarybird, like so many other raptors, uses its feet. Indeed, watching a secretarybird chase down and use well-aimed kicks and stamps to stun or kill a snake is amazing to watch. They exhibit remarkable force and accuracy as they basically lift their leg up to the body and punch the snake in the head at about 200



Photo by: Nili Gudhka





Photo by: Kalika Shah



Photo by: Peter Hudson

Newtons, which is basically 5 times their own body weight. As a comparison, a professional boxer will punch at about 3.5 times their body weight, so the secretary bird gives a big punch. The birds have legs almost twice as long as any bird of similar mass so we can assume the really long legs are an adaptation for killing prey. Interestingly, the secretary bird shares many bone characteristics with the extinct 'terror birds' which also relied on the use of a strong kick to kill their prey. These amazing birds used to inhabit South America where some species were more than 10 feet (3m) tall and would kill mammals and reptiles.

Catching and eating venomous snakes is a dangerous game so many snake-eating vertebrates, like mongoose, have developed special means of protecting themselves against the snake's venom. The -neurotoxins that many venomous snakes have act to bind tightly to a receptor that is found on skeletal muscles of vertebrates, and in so doing stops the neurotransmitters from activating the muscles. In effect this leads to paralysis so the snake can just make a rapid strike and then wait as the prey dies, ensuring it doesn't get bitten or kicked before consuming a fresh meal. When you spend your life feeding on venomous snakes then selection should favor those individuals that have evolved venom resistance mechanisms. Indeed, most vertebrates accept that if they eat venomous snakes they are going to get bitten and have evolved the means by which the toxins are blocked from binding to the receptor and so avoid the paralyzing effects. The exception is the secretary bird who have not evolved any obvious receptor blocking





Photo by: Nisha Purushothaman

resistance to venom. This could mean one of two things, either the birds do not have the genetic ability for this to evolve or alternatively they simply do not face this problem because they rarely get bitten by snakes. Since they kick box the snake and have thick scales on their legs, it would appear the snakes may rarely if ever get their fangs into the soft tissue of the secretarybird and so they avoid exposure to the toxin.

### **Threatened species**

As a unique bird we should worry about the preservation of the secretarybird. In 2016 it was designated by the IUCN as Vulnerable and recently, in 2020, listed as Threatened. The main reason was because the few indicators we have all show the population is decreasing throughout much of its range at an alarming rate. The birds are distributed over a wide part of sub Saharan Africa (excluding the rain forests) where there are now thought to be between 70,000 and 100,000 individuals. Indeed, it is the most threatened raptor species in western Africa, although in some areas it seems to be doing well in protected areas and interestingly amongst some types of crops where presumably their food is abundant. The decline has been very evident in Tanzania and South Africa, where it was once abundant and has exhibited a massive decline over the past 25 years. Indeed, part of the issue with the secretarybird is that we know so very little about it, there are no systematic monitoring

schemes, no recovery plans, no awareness programs and it is not included in any international conservation legislation.

The main threats the secretary bird faces are mostly associated with human encroachment and habitat loss indicating both disturbance that may affect nesting trees and loss of places to capture food. In some parts of its distribution the species is not persecuted because of its good ability to kill snakes but in other areas the young are taken from the nest when the nest is accessible. They are mostly solitary and sedentary, although frequently pairs will forage together, and they will become nomadic and follow rainfall or fires and capture animals that are flushed from the flames.

I suspect it is the immature birds that suffer the most. While the adults tend to stay with a nest site and initially the young remain close, they subsequently wander up to 150km from their nesting site in search of unoccupied suitable territories before retuning close to the parents nest. This extensive wandering exposes them to accidents with fences and wires and brings them into contact with humans. Having this bird slowly slip into oblivion would be shameful, it is one of those charismatic and special species of Africa along with the elephant, giraffe, and cheetah. We need to make people more aware about the stet and issues of the wonderful secretary bird.







Photo by: Peter Hudson















Photo by: Peter Hudson





Photo by: Peter Hudson



















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