



ANIMA MUNDI

Adventures in Wildlife Photography

Issue 28, Year 7 - October 2017

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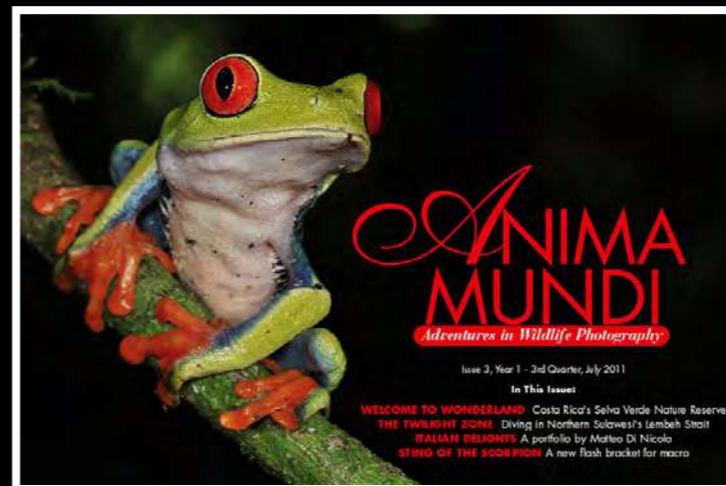
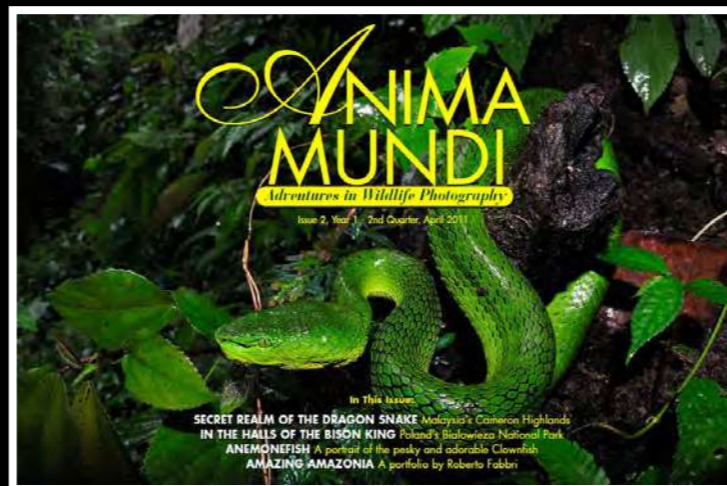
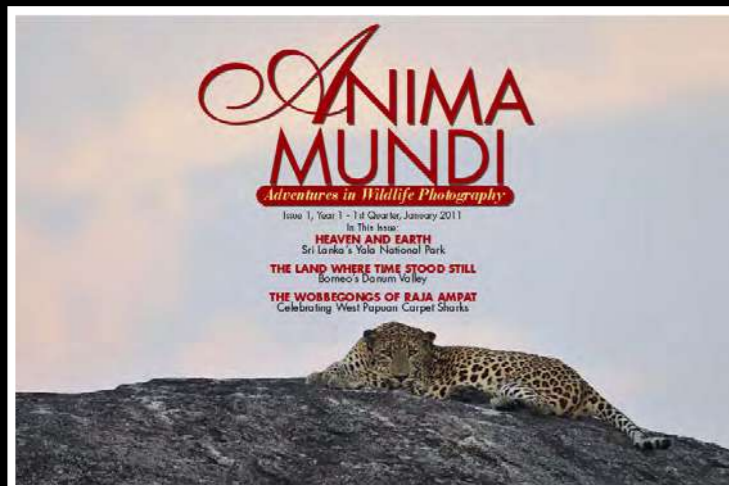
SCOOP The elusive Clouded leopard

REALM OF THE UNICORN Kaziranga National Park

SEA OF SANDS Namibia's Sossusvlei

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CHINA'S CAVEFISH Mysterious life of the karst



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Dear Andrea & Antonella,

I have just finished reading your latest edition of Anima Mundi and I was inspired to write and say how much I am enjoying your publication and following your adventures. My wife and dive/photo partner Cherie and I were so inspired by your feature on Yala National Park that we booked a Safari with Eco Team and we had a fantastic time. It was exactly as portrayed in your article and we also followed your recommendations for visiting the cultural triangle in Sri Lanka. As we were leading one of our dive tours on a live aboard exploring the Maldives last June, a private side trip to Sri Lanka was clearly not to be passed up due to your information. So, I guess it's good news for you both that others are reading and responding to your work. So, we just wanted to give you some feedback, say hello and wish you all the best with your future adventures. Keep up the great work.

Kevin & Cherie Deacon
Dive 2000
Sydney, Australia.
www.dive2000.com.au

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Contact us for details at editor@animamundimag.com

ANIMA MUNDI

Adventures in Wildlife Photography

As Time (and the World) Go By

Can you believe it? Another year - our seventh - is gone, and this is our 28th issue! My goodness, time really flies at our age - a good reason to travel as much as we can and see as much as possible of what is left in this beleaguered world of ours. There still is a huge number of fascinating destinations to choose from out there, and once again we're offering you a wide range of trip suggestions in our new issue.

We begin on page 4 with an unbelievable documentation from the wild - our contributor Archana Singh's hard-earned encounter with the near-legendary and highly elusive Clouded leopard in the forests of Assam.

And from Assam again originates this issue's main feature - the story of our childhood dream trip - an expedition to a destination we'd longed to visit for a great many years. And we finally did - so read about the beauty and charm of Kaziranga National Park, North-eastern India's dreamland - starting from page 11. One-horned rhinos, elephants, tigers, cobras, otters, hornbills - Kaziranga is a naturalist's dream come alive and a place every self-respecting wildlife photographer should visit at least once.

From the lush environment of Kaziranga we then travel to the bone-dry sand dunes of Namibia's Sossusvlei - a landscape photographer's paradise with its gorgeous colors, stunning panoramas

and ever-changing plays of light. Behold its unique fascination starting from page 65.

From the searing hot deserts of Namibia we then travel to the frozen wastes of the Far North with a selection of the best images from the 2016 edition of the Global Arctic Awards competition from Russia - our freezingly fascinating photo-gallery begins at page 88.



We wrap this issue up with our contributor, staunch environmentalist, field researcher and San Antonio's conservation and research department vice-president Dante Fenolio's report from the underground cave system in South China, which he visited to document the endangered troglodytic fauna exclusively found there. His story makes

great reading and it begins on page 100.

Finally, let us remind you that our Parting Shot column is now open for publication to reader's photos. So if you would like to be featured in it and think you have clicked an interesting wildlife image, just send an email to editor@animamundimag.com and we'll gladly take a look at it!

In the meantime...

Have a good trip!
Andrea & Antonella Ferrari
www.animamundimag.com

■ The Great Indian or One-horned rhino *Rhinoceros unicornis* is Kaziranga's iconic species - see page 11.



We appreciate your feedback
- constructive criticism, useful
suggestions and interesting
contributions are welcome.
Please drop us a line at
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Publishers
Andrea and Antonella Ferrari
editor@animamundimag.com

Editor-in-Chief
Andrea Ferrari
editor@animamundimag.com

Original Layout Design
Laura Genovese
Anna Bortolini

Videographer
Antonella Ferrari
anto@animamundimag.com

Video Editing
Leon Joubert & Claudia
Pellarini-Joubert
info@bittenbysharks.com

Technical Support
César Acuña Luzuriaga
scesarin@gmail.com

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**The stunningly beautiful sand
dune landscapes of Namibia's
Sossusvlei - see page 65.**

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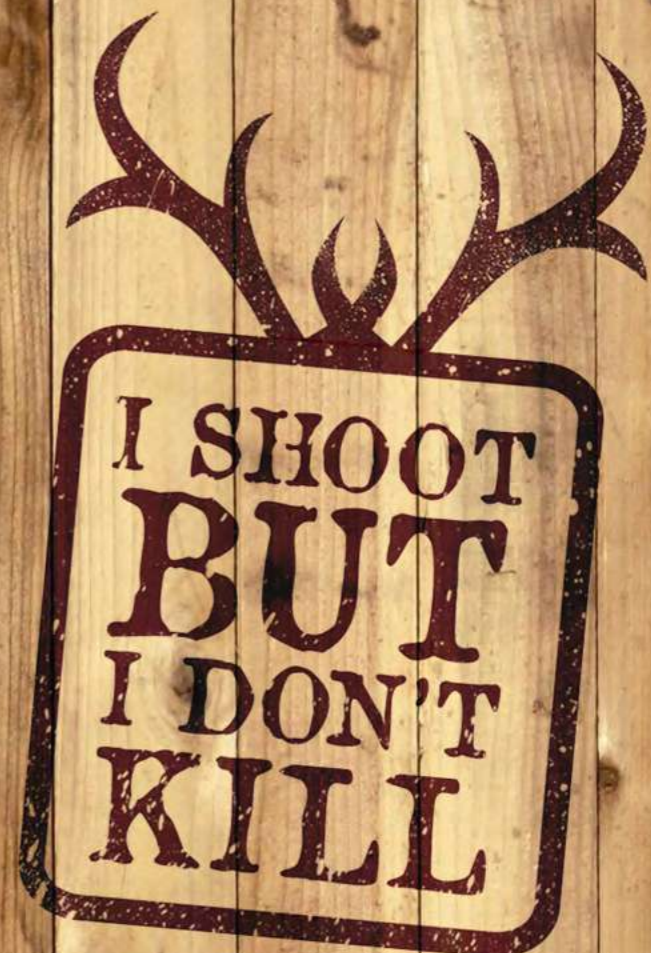


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INDIA'S ELUSIVE CLOUDED LEOPARD **FELINE DREAM DATE**

ARCHNA SINGH ENCOUNTERS AND PHOTOGRAPHS
THE LEGENDARY CAT IN THE FORESTS OF ASSAM

*The Clouded leopard **Neofelis nebulosa** is one of the wild cats found in the North East Indian states of Assam to Arunachal Pradesh, and the smallest among the big cats family of India.*



The Clouded leopard occurs from the Himalayan foothills through mainland Southeast Asia into China. Since 2008, it is listed as Vulnerable on the IUCN Red List. Its total population is suspected to be fewer than 10,000 mature individuals, with a decreasing population trend, and no single population numbering more than 1,000 adults.

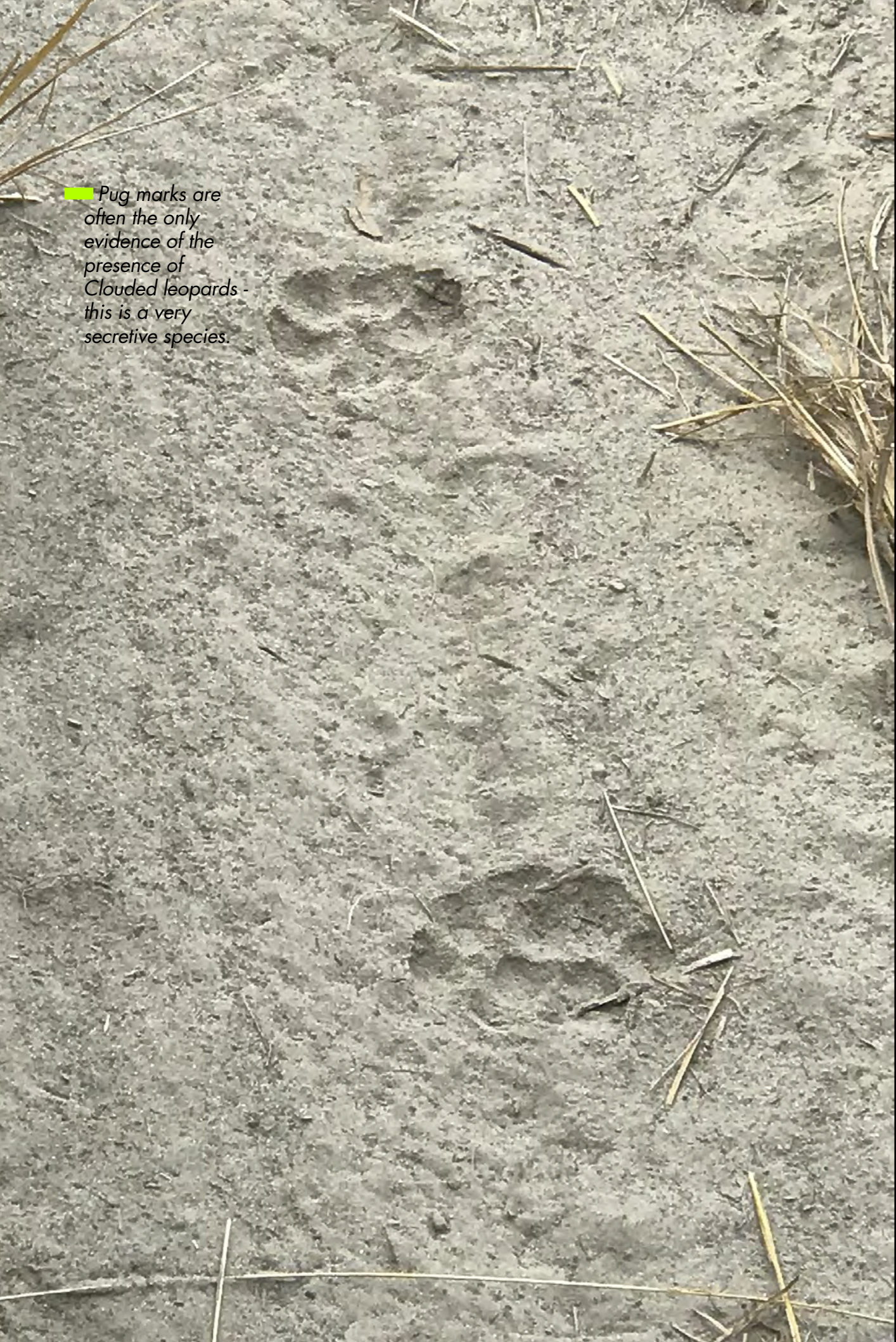


TEXT AND PHOTOS
BY ARCHNA SINGH

We arrived at Manas late in the evening of 28th January 2017. It was dark by the time we reached. This was my first visit to Manas and I was excited to experience a new Park and what I find here. It is not a well-established Park as far as safari organization is concerned. The guides and drivers mostly are locals who have little knowledge of the Park, its species or identifying and tracking pugmarks. That meant mostly we had to rely on ourselves for identifying or tracking any predators that we might find. Although knowing that it is rare to see tigers here, I was still hopeful of sighting one and with that mindset I arrived in Manas. The first hoarding of the National Park that I saw from the car was

impressively lit and had a beautiful tiger picture. But what caught my eye was another picture of a Clouded leopard right besides it. Till now, despite having known that the Clouded leopard is a resident in this Park, I really hadn't thought about it that much. I never thought there was a remote chance also to sight one, due to their small numbers and very elusive and shy nature. It is almost impossible to witness one let alone taking a picture of these shy cats. The Clouded leopard *Neofelis nebulosa* is one of the wild cats found in the North East Indian states of Assam to Arunachal Pradesh, the smallest among the big cats family of India and an arboreal animal found in the Himalayan foothills, which is classified as Vulnerable

because of habitat loss, deforestation, illegal trading and poaching for skin, claws and teeth. The exact numbers of this secretive cat are not known but they are believed to be fewer than 10,000 adults left in the wild world. Clouded leopards are the most talented climbers among the cats. In captivity, they have been observed to climb down vertical tree trunks head first, and hang on to branches with their hind paws and their tail around them. They can climb on horizontal branches with their back to the ground, and in this position make short jumps forward. Apart from information stemming from observations of captive clouded leopards, little is known of their natural history and behavior in the wild. Early



Pug marks are often the only evidence of the presence of Clouded leopards - this is a very secretive species.

accounts depict them as rare, secretive, arboreal, and nocturnal denizens of dense primary forest. More recent observations suggest they may not be as arboreal and nocturnal as previously thought. They may use trees as daytime rest sites, but also spend a significant proportion of time on the ground. Some daytime movement has been observed, suggesting they are not strictly nocturnal but crepuscular. Their partly nocturnal and far-ranging behavior, their low densities, and because they inhabit densely vegetated habitats and remote areas makes the counting and monitoring of Clouded leopards extremely difficult. Consequently, little is known about their behavior and status. Available information on their ecology is anecdotal, based on local interviews and a few sighting reports. So until now I was not even thinking about the Clouded leopard, but seeing that image made my mind flip from the tiger in a complete 360-degree turn. No matter how hard I tried, all I could think of was the Clouded leopard. By the time I arrived at the hotel and settled down, I was all set to research about this cat and by morning I had studied and read all about it on the internet. Excited, we left for the first safari on the morning of 29th. Not knowing what to expect, we ventured into the beautiful forest of Manas with an open mind. What followed was a series of tiger pugmarks at not one place but two different areas. We also saw pugmarks of the Clouded leopard in another area, that seemed quite fresh, either from the previous night or early that morning. This got us super excited. The day ended however with no sighting, not a single animal let alone a predator. Till now I hadn't realized how dense the foliage of the Park was and how skittish its animals. With its long history of Bodoland insurgency and the indiscriminate poaching of animals that followed, its not surprising. Assam, one of the seven states of the

North Eastern region of India, has long remained one of the most volatile and sensitive regions in the country because of the problems of Bodo insurgency, ethnic conflict, pressure of migration, underdevelopment etc. Since 2003 things are getting back to normal, but this long drawn state of affairs did result in the immense destruction of wildlife and is also responsible for their extremely skittish behavior. It will be several years before Manas's animals grow out of their fear of humans and become less evasive and used to tourists. The next day we found super fresh pugmarks of two tigers – one smaller than the other and apparently seemed like that of a mother and her young one. We also found fresh pugmarks of a male tiger from another area. It seemed like the tiger was very near and would show himself any time. Unfortunately, no such luck, and we exited the jungle with no sighting the whole day. Not only did we not see any predator we had barely seen any other animal in the entire Park. It was quite frustrating to not even have an opportunity to see any animal besides the squirrels and langurs for two days now. On our third day - 31st January - we saw fresh pugmarks of the tiger again and it was quite possible that it had just disappeared into the jungle upon hearing the jeep. We waited patiently and took rounds of the area to find the tiger, but no luck. We went back for lunch and when we came back for the afternoon safari to the same area, we saw fresh pugmarks of the Clouded leopard over the tyres of our jeep, confirming the fact that the cat had crossed that area in the afternoon just before we came. This strengthened my belief that there just might be a possibility of us witnessing this elusive cat in the wild, if it does venture out during the

Clouded leopards weigh between 11.5 and 23 kg (25 and 51 lb). Females vary in head-to-body length from 68.6 to 94 cm (27.0 to 37.0 in), with a tail 61 to 82 cm (24 to 32 in) long. Males are larger at 81 to 108 cm (32 to 43 in) with a tail 74 to 91 cm (29 to 36 in) long. Their shoulder height varies from 50 to 55 cm (20 to 22 in).



■ The fur of Clouded leopards is of a dark grey or ochreous ground-color, often largely obliterated by black and dark dusky-grey blotched pattern. There are black spots on the head, and the ears are black. Partly fused or broken-up stripes run from the corner of the eyes over the cheek, from the corner of the mouth to the neck, and along the nape to the shoulders.



Clouded leopards ■ have exceptionally long, piercing canine teeth, the upper being about three times as long as the basal width of the socket. The upper pair of canines may measure 4 cm (1.6 in) or longer.



day. It was definitely very exciting. After two days of tracking its pugmarks and following them, expectations were still very bleak as it is rarely to be seen, let alone during the day, but we were extremely fortunate to have identified the sounds that it made this day. Having confirmed that the sound was indeed that of a Clouded leopard, we stopped right there, near a dry river bed, where the pug marks were also being seen for the last two days, we waited patiently in and around that area, trying to hear any sounds that might come from this cat that clearly was in the vicinity. It wasn't long before when we heard some movement in the bushes and to our utter disbelief what came out was this tiny little thing known as the Clouded leopard. It seemed slightly bigger than a domestic cat, slightly longish with quite a long and bushy tail though. It still seems like a dream that I actually saw one. Not believing my eyes, I kept confirming the fact that it was indeed the Clouded leopard. It was a few moments before I could reach out for my camera to take some images. Here are some of my favorite shots. The sighting was short and the light wasn't all that great in the middle of the afternoon, but hey, it's a Clouded leopard, right? Just being able to see him, let alone photograph it, was a blessing in itself.

Sadly many of the remaining forest areas are too small to ensure the long-term persistence of Clouded leopard populations. They are threatened by habitat loss following large-scale deforestation and commercial poaching for the wildlife trade. Skins, claws, and teeth are offered for decoration and clothing, bones and meat as substitute for tiger in traditional Asian medicines and tonics, and live animals for the pet trade. Few poaching incidents have been documented, but all range states are believed to have some degree of commercial poaching. In recent years, substantial domestic markets existed in Indonesia, Myanmar, and Vietnam.



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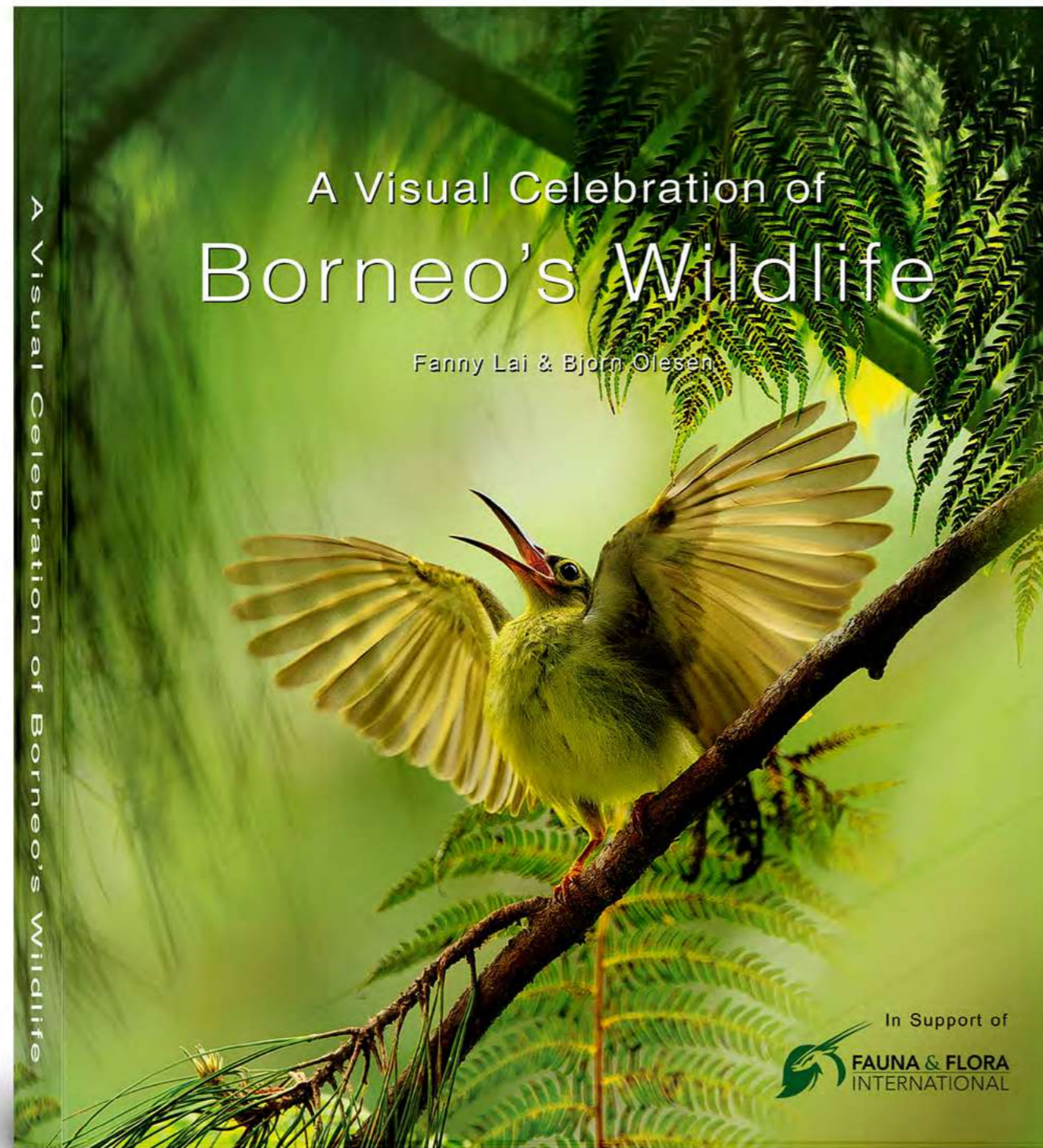
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Sprawling among the tea estates of North-Eastern India, the grassy realm of the mighty One-horned rhino is a destination the wildlife photographer cannot afford to miss



■ A quintessential Kaziranga NP image as a Wild water buffalo *Bubalus arnee* and a Great Indian One-horned rhino *Rhinoceros unicornis* cross a trail in front of a Gypsy loaded with visitors.



■ Grey-headed fish eagle
Ichthyophaga ichthyaetus.

TEXT BY ANDREA FERRARI
PHOTOS BY ANDREA & ANTONELLA FERRARI

There are some places which have an air of magic about them - an aura of legend. Such places are often to be found in the Indian subcontinent, at least according to our experience: and Kaziranga is one of them. Long we had desired to visit it, since reading about it during our long-gone youth - but politics, unrest and other matters interfered for many years, until we finally crowned our dream in 2015. And we were not disappointed, because Kaziranga it is indeed a place of fable and legend for the true nature and wildlife lover. Kaziranga is a National Park located in the State of Assam, North-Eastern India. Its environment comprises vast expanses of tall elephant grass, marshland, and dense tropical moist broadleaf forests, criss-crossed by four major rivers, including the mighty Brahmaputra, plus numerous small bodies of water. The sanctuary, which hosts two-thirds of the world's great one-horned rhinoceroses, is a World Heritage Site. According to

the census held in March 2015, which was jointly conducted by the Forest Department of the Government of Assam and some recognized wildlife NGOs, the rhino population in Kaziranga National Park is 2,401, comprising 1,651 adult rhinos (663 male, 802 females, 186 unsexed); 294 sub-adults (90 males, 114 females, 90 unsexed); 251 juveniles and 205 cubs. Kaziranga is also home to the highest density of tigers among protected areas in the world, and was declared a Tiger Reserve in 2006. The Park is home to large breeding populations of elephants, wild water buffalo, and swamp deer, and it is recognized as an Important Bird Area by BirdLife International for conservation of avifaunal species. When compared with other protected areas in India, Kaziranga has achieved notable success in wildlife conservation. Located on the edge of the Eastern Himalaya biodiversity hotspot, the Park combines high

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Indian elephant
Elephas maximus indicus.





■ *Great Indian
or One-horned
rhinoceros*
Rhinoceros
unicornis.

species diversity and visibility, and as such is an absolute must in the bucket list of the destinations to be visited by the serious wildlife photographer.

A LITTLE BIT OF HISTORY

The history of Kaziranga as a protected area can be traced back to 1904, when Mary Curzon, Baroness Curzon of Kedleston, the wife of the Viceroy of India, Lord Curzon of Kedleston, visited the area. After failing to see a single rhinoceros - for which the area was renowned- she persuaded her husband to take urgent measures to protect the dwindling species, which he did by initiating planning for their protection. On 1 June 1905, the Kaziranga Proposed Reserve Forest was created with an area of 232 km² (90 sq mi). Over the next three years, the area was extended by 152 km² (59 sq mi), to the banks of the Brahmaputra river. In 1908, Kaziranga was designated a "Reserve Forest". In 1916, it was redesignated the "Kaziranga Game Sanctuary" and remained so till 1938, when hunting was prohibited and visitors were permitted to enter the Park. The Kaziranga Game Sanctuary was renamed the "Kaziranga Wildlife

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Wild water buffalo *Bubalus arnee* with calf.

Sanctuary" in 1950 by P. D. Stracey, the forest conservationist, in order to rid the name of hunting connotations. In 1954, the government of Assam passed the Assam (Rhinoceros) Bill, which imposed heavy penalties for rhinoceros poaching. Fourteen years later, in 1968, the State government passed the Assam National Park Act of 1968, declaring Kaziranga a designated National Park. The 430 km² (166 sq mi) park was given official status by the central government on 11 February 1974. In 1985, Kaziranga was declared a World Heritage Site by UNESCO for its unique natural environment. However, Kaziranga has been the target of several natural and man-made calamities in recent decades. Floods caused by the overflow of the river Brahmaputra occur regularly and often catastrophically, leading to significant losses of animal life. Encroachment by people along the periphery has also led to a diminished forest cover and a loss of habitat. An ongoing separatist movement in Assam led by the United Liberation Front of Assam (ULFA) has crippled the economy of the region, but Kaziranga has remained unaffected by the

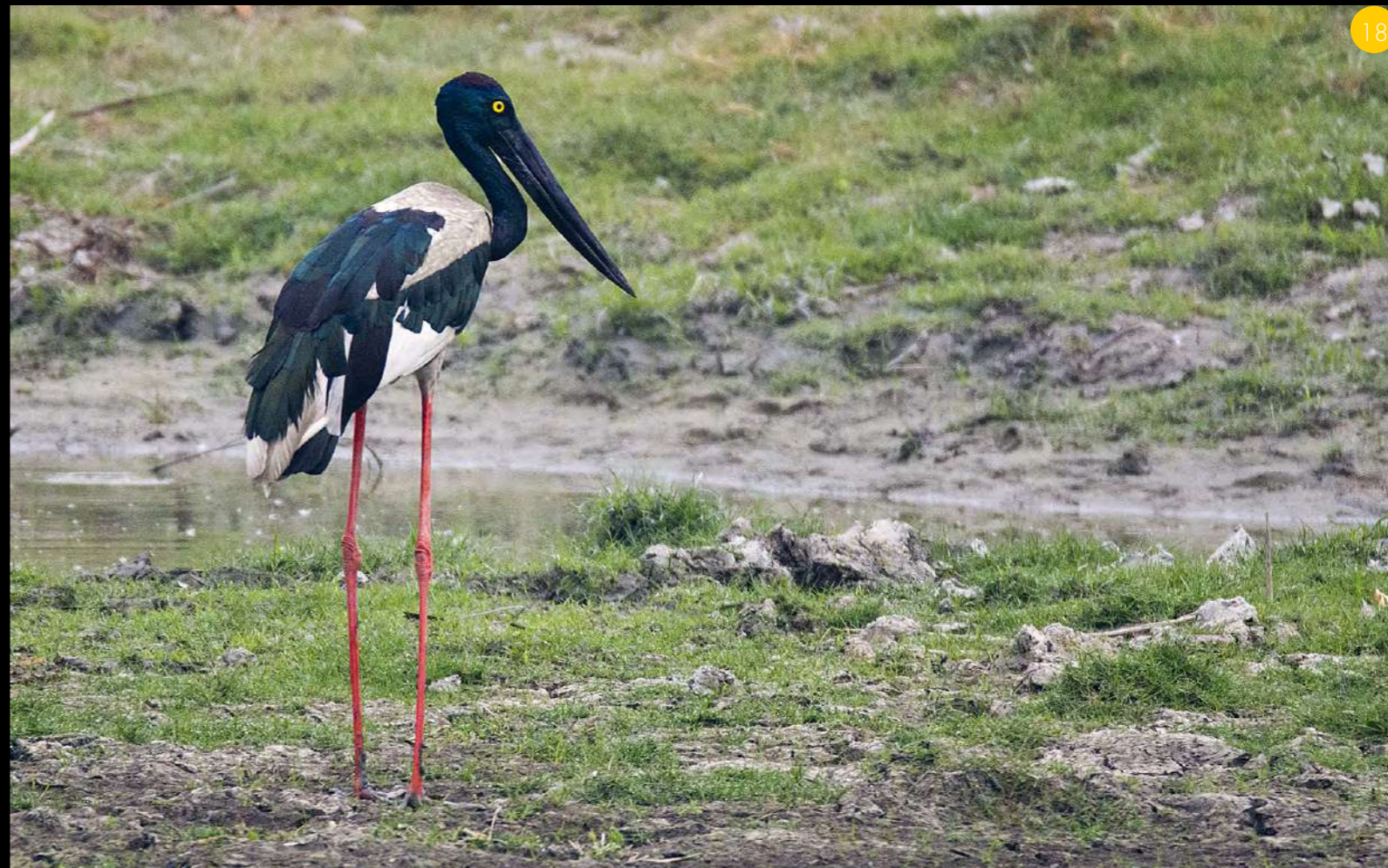
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Pallas's fish eagle ■
Haliaeetus leucoryphus.



Left, Indian hog deer
Axis porcinus;
right top,
Black-necked stork
Ephippiorhynchus asiaticus;
right bottom,
Green-billed malkoha
Phaenicophaeus tristis.



A pair of Royal Bengal tiger *Panthera tigris* in the far distance. This is actually a lucky shot, as - despite the high density of tigers in Kaziranga - good sightings there are neither frequent nor easy.




movement; indeed, instances of rebels from the United Liberation Front of Assam protecting the animals and, in extreme cases, killing poachers, have been reported since the 1980s.

TOPOGRAPHY AND CLIMATE

Kaziranga is located within two districts in the Indian state of Assam - the Kaliabor subdivision of Nagaon district and the Bokakhat subdivision of Golaghat district. The Park is approximately 40 km (25 mi) in length from east to west, and 13 km (8 mi) in breadth from north to south. Kaziranga covers an area of 378 km² (146 sq mi), with approximately 51.14 km² (20 sq mi) lost to erosion in recent years. A total addition of 429 km² (166 sq mi) along the present boundary of the Park has been made and designated with separate National Park

continued on page 24 ➤

Male Kalij pheasant 
Lophura leucomelanos.





Left, Smooth-coated otters *Lutrogale perspicillata*; right, Great Indian or One-horned rhinoceros *Rhinoceros unicornis*.





Great Hornbill ■
Buceros bicornis in flight -
possibly Kaziranga's
most impressive
bird species.



Far left, Ringneck or Rose-ringed parakeet *Psittacula krameri*; left, Great Indian or One-horned rhinoceros *Rhinoceros unicornis*.

status to provide an extended habitat for increasing the population of wildlife or as a corridor for safe movement of animals to Karbi Anglong Hills. Elevation ranges from 40 m (131 ft) to 80 m (262 ft). The Park area is circumscribed by the Brahmaputra river, which forms the northern and eastern boundaries, and the Mora Diphlu, which forms the southern boundary. Other notable rivers within the park are the Diphlu and Mora Dhansiri. Kaziranga has flat expanses of fertile, alluvial soil, formed by erosion and silt deposition by the Brahmaputra. The landscape consists of exposed sandbars, riverine flood-formed lakes known as *beels*, (which make up 5% of the surface area), and elevated regions known as *chapories*, which provide retreats and shelter for animals during floods. Many artificial *chapories* have been built with the help of the Indian Army to ensure the safety of the animals. Kaziranga is one of the largest tracts of protected land in the sub-Himalayan belt, and due to the presence of highly diverse and visible species, has been described as a "biodiversity hotspot". The Park is located in the Indomalaya ecozone, and the dominant biomes of the region are Brahmaputra Valley semi-evergreen forests of the tropical and subtropical moist broadleaf forests biome and a frequently flooded variant of the Terai-

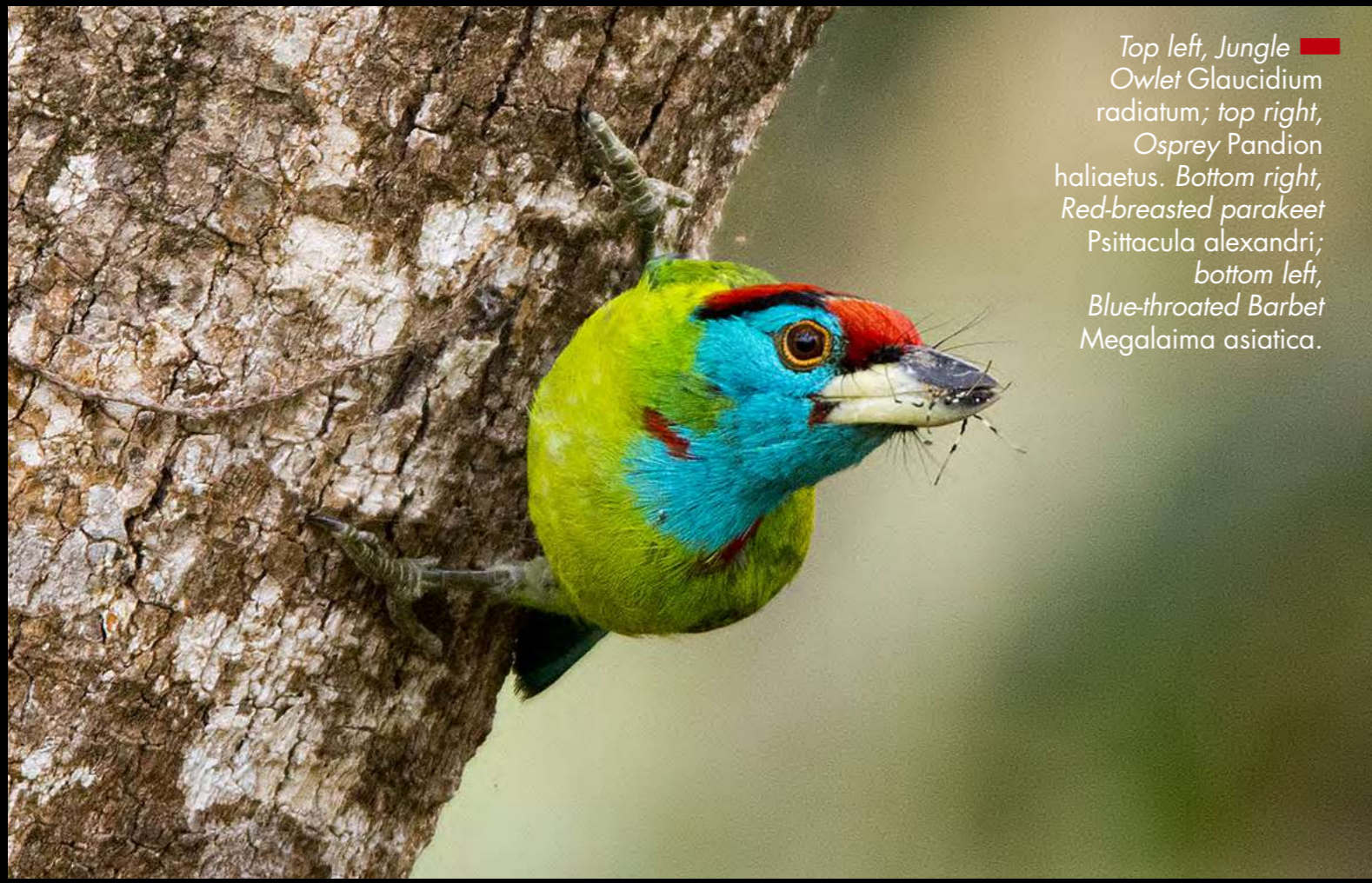
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Lined barbet █
Psilopogon lineatus.

■ *Great Indian
or One-horned
rhinoceros
Rhinoceros
unicornis are often
found bathing in
pools and rivers.*





Top left, Jungle
Owlet *Glaucidium
radiatum*; top right,
Osprey *Pandion
haliaetus*. Bottom right,
Red-breasted parakeet
Psittacula alexandri;
bottom left,
Blue-throated Barbet
Megalaima asiatica.



Great Indian
or One-horned rhinoceros
Rhinoceros unicornis.



Indian elephant *Elephas maximus indicus*.



Duar savanna and grasslands of the tropical and subtropical grasslands, savannas, and shrublands biome. Kaziranga is also surrounded by lush green tea plantations, most of them contributing heavily to Assam's economy. The Park experiences three seasons: summer, monsoon, and winter. The winter season, between November and February, is mild and dry, with a mean high of 25 °C (77 °F) and low of 5 °C (41 °F). During this season, *beels* and *nullahs* (water channels) dry up. The summer season between March and May is hot, with temperatures reaching a high of 37 °C (99 °F). During this season, animals usually are found near water bodies. The rainy monsoon season lasts from June to September, and is responsible for most of Kaziranga's annual rainfall of 2,220 mm (87 in). During the peak months of July and August, three-fourths of the western region of the park is submerged, due to the rising water level of the Brahmaputra. It was found that 70% of the National Park was flooded as on 3 August 2016. The flooding causes most animals to migrate to elevated and forested regions outside the southern border of the park, such as the Mikir hills. 540 animals, including 13 rhinos and mostly hog deers perished in unprecedented floods of 2012. However, occasional dry spells create problems as well, such as food shortages and occasional forest fires.

continued on page 30 >

Top left, Pied myna or Asian pied starling *Gracupica (Sturnus) contra*; top right, Spangled drongo or Hair-crested drongo *Dicrurus hottentottus*; bottom right, Chestnut-headed bee-eater *Merops leschenaulti*; bottom left, Greater coucal *Centropus sinensis*.





■ *One-horned rhino Rhinoceros unicornis and Barasingha Cervus duvaucelii. Due to high humidity, excessive dryness or the soot and ashes from burning grasslands, skies in Kaziranga are very rarely blue.*

A TREASURE TROVE OF WILDLIFE

Kaziranga contains significant breeding populations of 35 mammalian species, of which 15 are threatened as per the IUCN Red List. The Park has the distinction of being home to the world's largest population of the Greater One-Horned Rhinoceros (1,855), wild Asiatic water buffalo (1,666) and Eastern Swamp deer (468). Significant populations of large herbivores include elephants (1,940), gaur (30) and sambar (58). Small herbivores include the Indian muntjac, wild boar, and hog deer. Kaziranga has the largest population of the Wild water buffalo anywhere accounting for about 57% of the world population. Kaziranga was declared a Tiger Reserve in 2006 and has the highest density of tigers in the world (one per five km²), with a population of 118, according to the latest census. Kaziranga has the rare distinction of being one of the very few places in the

continued on page 35 ➤



■ Monocellated
cobra *Naja*
kaouthia.



■ Far left,
 Changeable
 hawk-eagle or
 Crested hawk-
 eagle *Nisaetus*
cirrhatus; center,
 Indian roller
Coracias
benghalensis;
 right, Oriental
 pied-hornbill
Anthracoceros
albirostris.

■ Indian elephant
Elephas maximus indicus with Wild
water buffalo
Bubalus arnee
grazing in the
distance. It is easy
to understand
why Kaziranga
is known as "the
Serengeti of Asia".





■ Left, Blue-bearded bee-eater
Nyctyornis athertoni;
right, River Tern
Sterna aurantia.



world which contain breeding populations of three big cats outside Africa - the Royal Bengal tiger, the Indian leopard and the Clouded leopard. Kaziranga had a population of around 30 Bengal tigers during the 1972 census, which grew 187% to 86 in the 2000 census, distinguishing Kaziranga with one tiger for each five km² of park area, the highest tiger density in the world. Due to Kaziranga's higher prey density compared to other Parks of India, the tigers in here may grow to a larger size as a result. Other felids include the jungle cat, fishing cat, and leopard cat. Small mammals include the rare hispid hare, Indian gray mongoose, small Indian mongooses, large Indian civet, small Indian civet, smooth-coated otter, Bengal fox, golden jackal, sloth bear, Chinese pangolin, Indian pangolins, hog badger, Chinese ferret badgers, and particoloured flying squirrel. Nine of the 14 primate species found in India occur in the Park. Prominent among them are the Assamese macaque, capped and golden langur, as well as the only ape found in India, the hoolock gibbon. Kaziranga's rivers are also home to the endangered Ganges dolphin. Kaziranga is home to a variety of migratory birds, water birds, predators, scavengers, and game birds. Birds such as the lesser white-fronted goose, ferruginous duck, Baer's pochard duck and lesser adjutant, greater adjutant, black-necked stork, and Asian openbill stork

continued on page 37 >



Great Indian
or One-horned
rhinoceros
Rhinoceros
unicornis.



■ Top left, Banded krait *Bungarus fasciatus*; top right, Orange-bellied Himalayan squirrel *Dremomys lokriah*. Bottom right, Indian wild boar *Sus scrofa*; bottom left, Hog badger *Arctonyx collaris*.



Indian elephant *Elephas maximus indicus*.

migrate from Central Asia to the Park during winter. Riverine birds include Blyth's kingfisher, white-bellied heron, Dalmatian pelican, spot-billed pelican, Nordmann's greenshank, and black-bellied tern. Birds of prey include the rare eastern imperial, greater spotted, white-tailed, Pallas's fish eagle, grey-headed fish eagle, and the lesser kestrel. Kaziranga was once home to seven species of vultures, but the vulture population reached near extinction, supposedly by feeding on animal carcasses containing the drug Diclofenac. Only the Indian vulture, slender-billed vulture, and Indian white-rumped vulture have survived. Game birds include the swamp francolin, Bengal florican, and pale-capped pigeon. Other families of birds inhabiting Kaziranga include the great Indian hornbill and wreathed hornbill,

continued on page 40 ➤





■ *Left, White-throated kingfisher Halcyon smyrnensis; center, Great Indian or One-horned rhino Rhinoceros unicornis at sunset; right, Alexandrine parakeet or Alexandrian parrot Psittacula eupatria.*



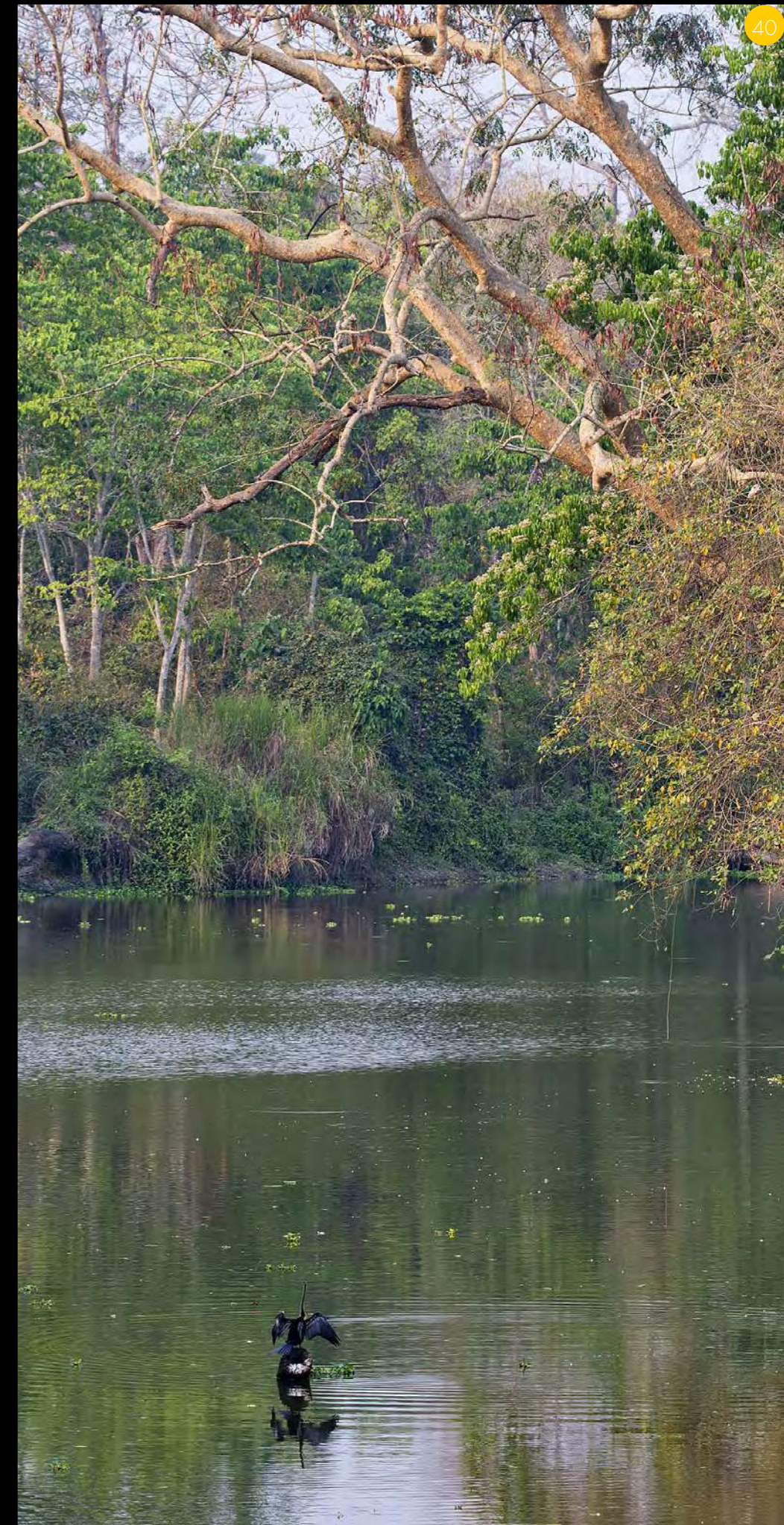
■ *Indian elephant*
Elephas maximus
indicus.





■ *Left, Oriental garden lizard Calotes versicolor; right, Oriental darter or Indian darter Anhinga melanogaster in a forest river landscape.*

Old World babblers such as Jerdon's and marsh babblers, weaver birds such as the common baya weaver, threatened Finn's weavers, thrushes such as Hodgson's bushchat and Old World warblers such as the bristled grassbird. Other threatened species include the black-breasted parrotbill and the rufous-vented prinia. Two of the largest snakes in the world, the reticulated python and rock python, as well as the longest venomous snake in the world, the king cobra, inhabit the park. Other snakes found here include the Indian cobra, monocled cobra, Russell's viper, and the common krait. Monitor lizard species found in the park include the Bengal monitor and the Asian water monitor. Other reptiles include fifteen species of turtle, such as the endemic Assam roofed turtle and one species of tortoise, the brown tortoise. 42 species of fish are found in the area, including the Ocellated Pufferfish. So - after going through such a long list - one really can understand why a visit to Kaziranga is imperative at least once in one's life. Nothing is guaranteed of course - as usual in nature - and many species won't show up, or only be glimpsed briefly; but we can guarantee that many others will, and that the magic of Kaziranga will make the trip well worth it. ●



One-horned rhino ■
Rhinoceros unicornis - notice
the typical, unmistakable,
Steampunk-looking "riveted
ironclad" appearance
of its thick hide.





Left, a trio of basking and severely endangered Assam roofed turtle *Pangshura sylhetensis*. Right, Indian elephant *Elephas maximus indicus* enjoying a dust bath.



A very exotic-
looking male
Kalij pheasant
Lophura leucomelanos -
this species is relatively
common in Kaziranga.

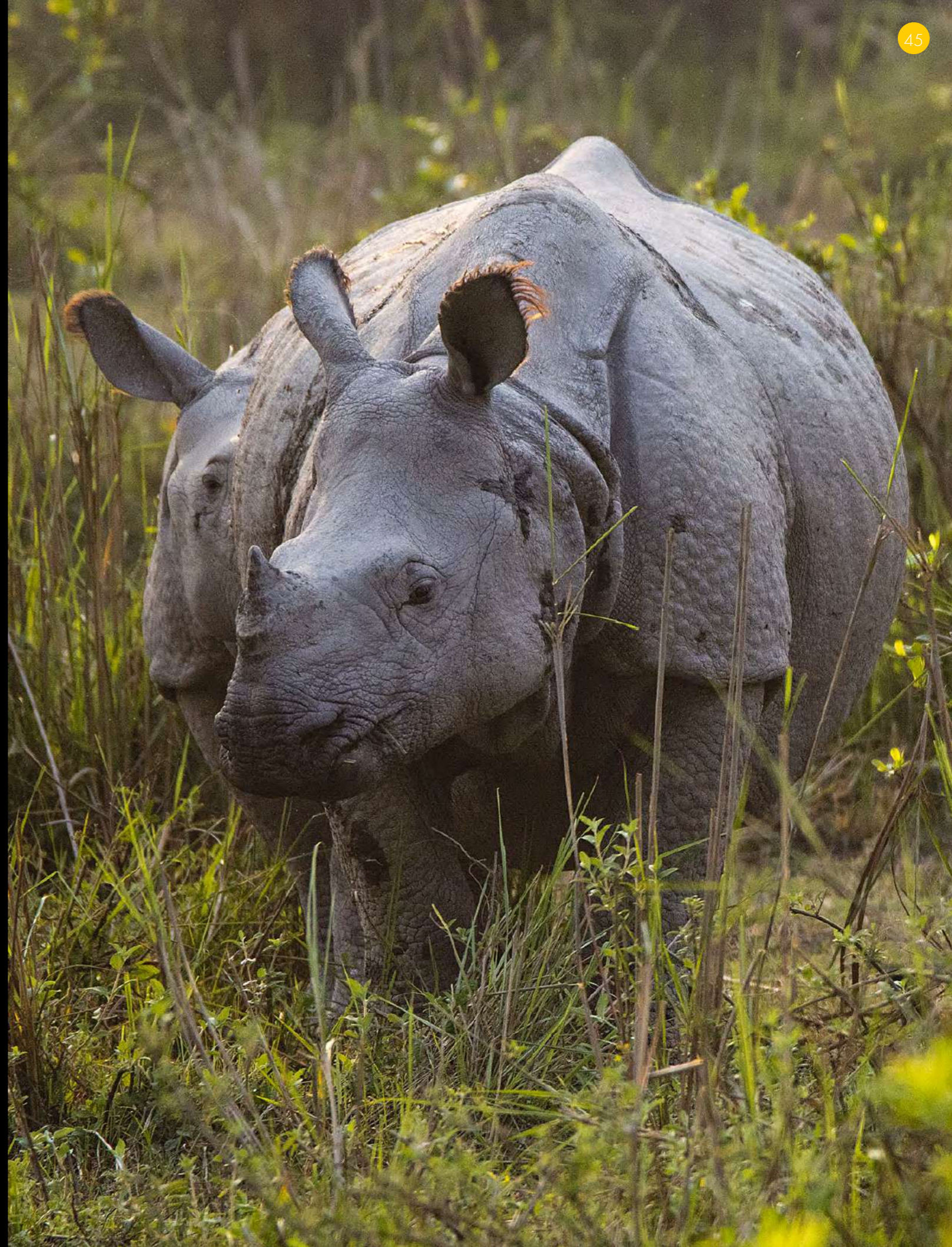





*This Great Indian
or One-horned rhinoceros
Rhinoceros unicornis has been
severely wounded in a fight
with a rival - rhinos can inflict
horrifying bites using their
sharp front teeth.*



■ *Left, an armed National Park warden on patrol - rhino poachers are a serious problem in Kaziranga, and get shot on sight; right, One-horned rhinoceros *Rhinoceros unicornis* female with its offspring.*





Red-breasted parakeet 
Psittacula alexandri.



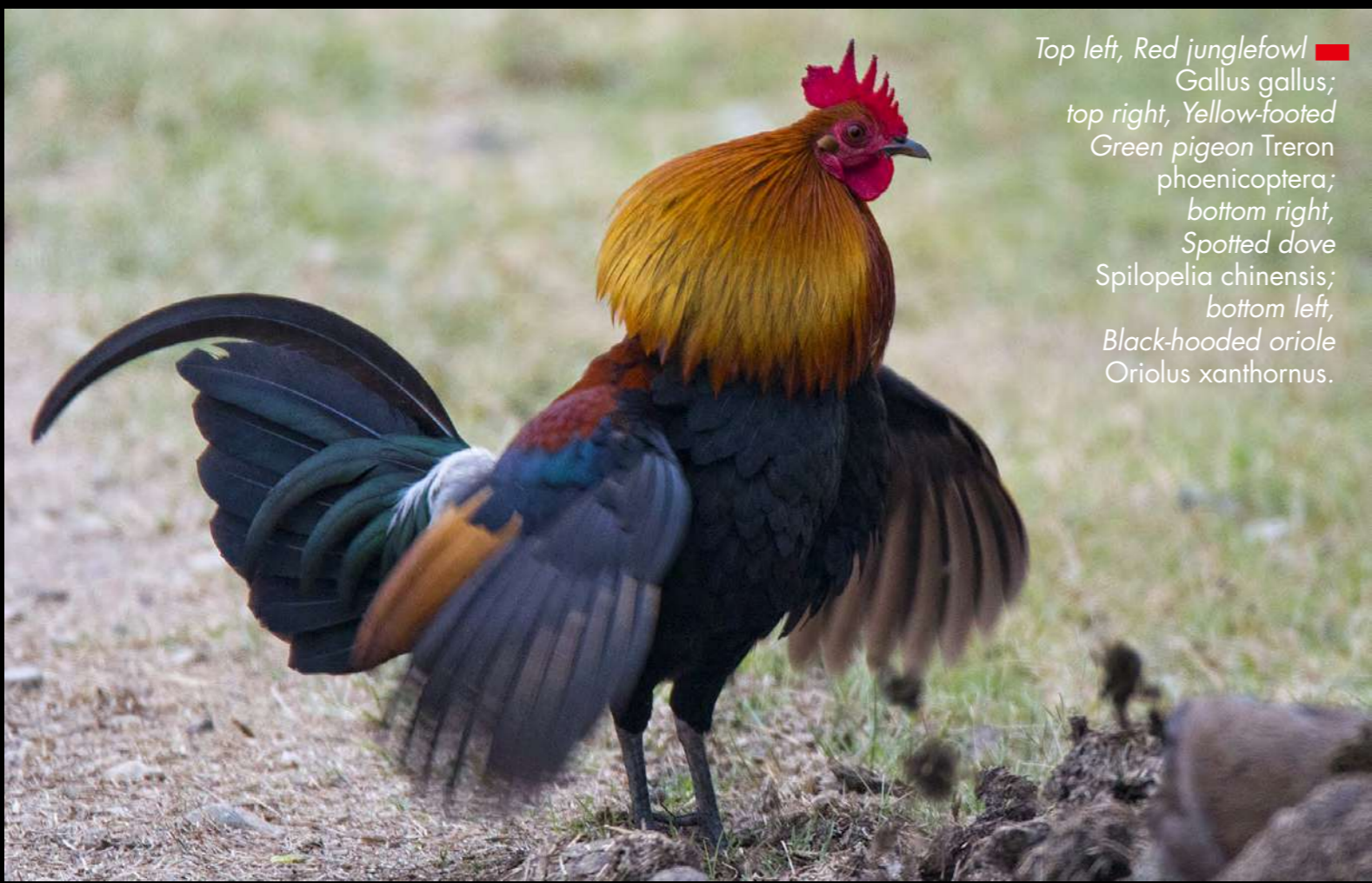
Indian elephant ■
Elephas maximus indicus.



■ Left, Common Bengal monitor *Varanus bengalensis*; right, Orange-bellied Himalayan squirrel *Dremomys lokriah*, preying on a beetle.

■ *Indian elephant*
Elephas maximus
indicus.





Top left, Red junglefowl ■
Gallus gallus;
 top right, Yellow-footed
 Green pigeon *Treron*
phoenicoptera;
 bottom right,
 Spotted dove
Spilopelia chinensis;
 bottom left,
 Black-hooded oriole
Oriolus xanthornus.



Indian hog deer ■
Axis porcinus.
This is a very common species in Kaziranga, often seen in large groups.

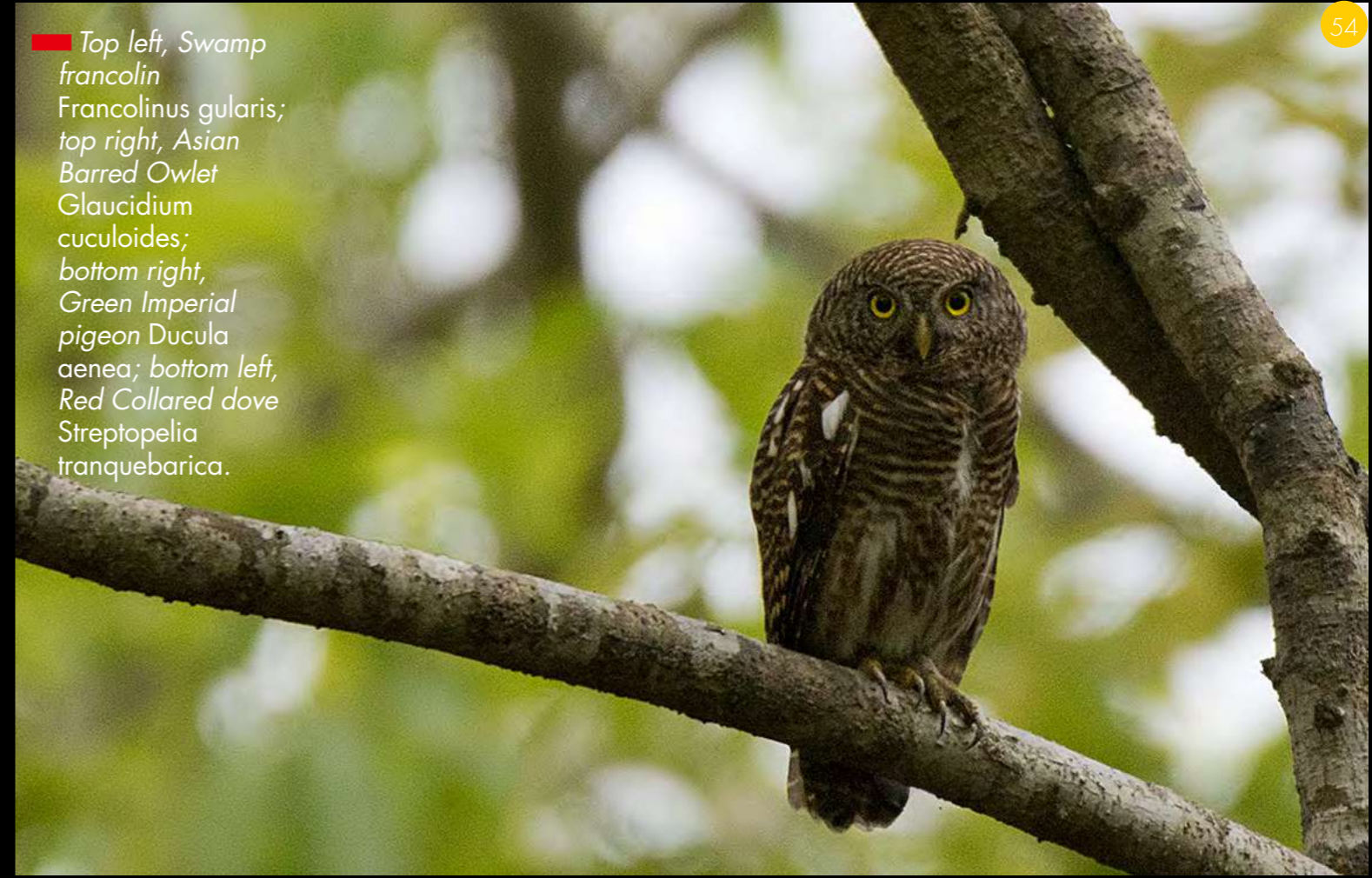


Top left, Common Hoopoe
Upupa epops;
 top right, White-rumped shama
Copsychus malabaricus;
 bottom right,
 Purple Heron
Ardea purpurea;
 bottom left,
 Blue-bearded bee-eater
Nyctyornis athertoni.





Great Indian
or One-horned
rhinoceros
*Rhinoceros
unicornis*



■ Top left, Swamp francolin *Francolinus gularis*; top right, Asian Barred Owlet *Glaucidium cuculoides*; bottom right, Green Imperial pigeon *Ducula aenea*; bottom left, Red Collared dove *Streptopelia tranquebarica*.





Left, Kalij pheasant *Lophura leucomelanos*; right, Ringneck or Rose-ringed parakeet *Psittacula krameri*.

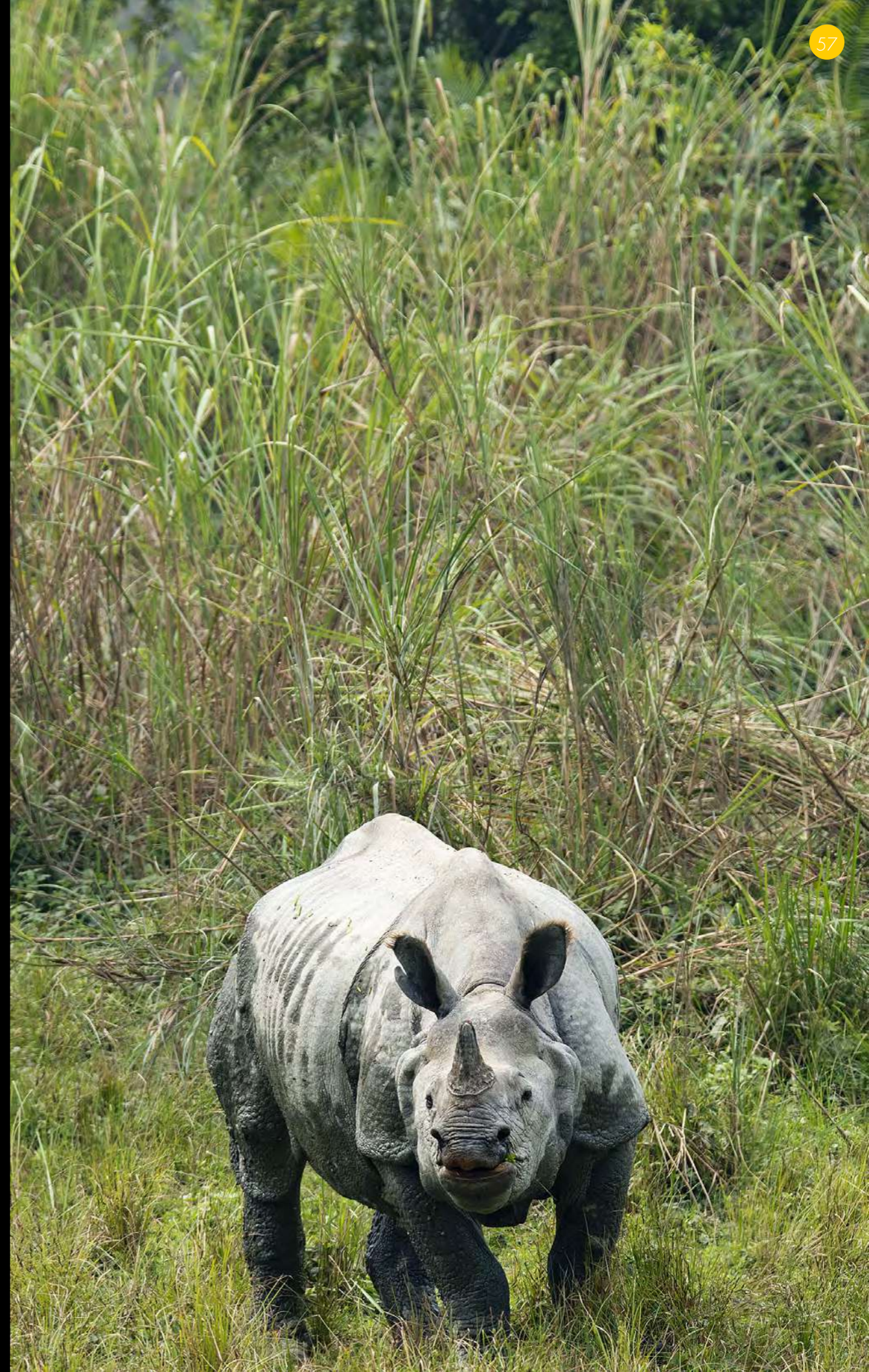




Smooth-coated otters *Lutrogale perspicillata*. This species can often be seen in noisy, chattering, very active groups by the riverbanks.



■ Left, Indian elephant *Elephas maximus indicus*; right, Great Indian or One-horned rhinoceros *Rhinoceros unicornis*.



Great Indian
or One-horned
rhinoceros
*Rhinoceros
unicornis*.



Left, Smooth-coated otters *Lutrogale perspicillata*; right, Crested serpent eagle *Spilornis cheela*.





Left, Great Hornbill *Buceros bicornis*; right, Green-billed malkoha *Phaenicophaeus tristis*.



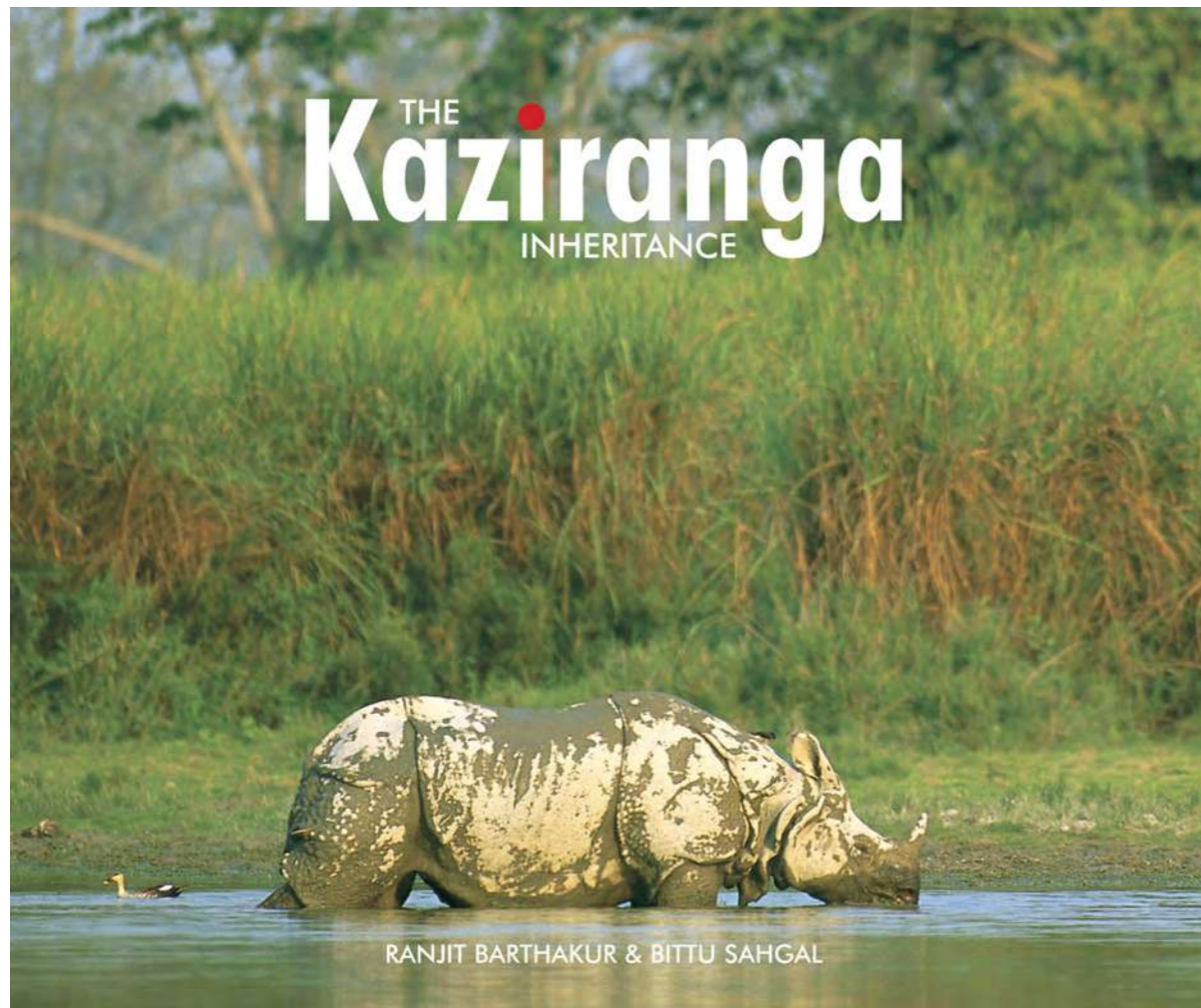


Great Indian ■
or One-horned rhinoceros
Rhinoceros unicornis.

The Kaziranga Inheritance

by Ranjit Barhakur and Bittu Sahgal

For those interested in reading and finding out more about Kaziranga NP and its wildlife-rich environment, we can safely recommend *Sanctuary Asia Magazine's* stunning coffee-table book *The Kaziranga Inheritance*, authored by Ranjit Barhakur and by Sanctuary's own legendary creator (and staunch activist) Bittu Sahgal. The volume is illustrated with hundreds of beautiful images of the Reserve's wildlife and habitats and is packed to the brim with in-depth, accurate, up-to-date information about Kaziranga, its present, its future and the problems it has to face. *The Kaziranga Inheritance* is part of a series entirely dedicated to India's spectacular and threatened natural heritage - other titles in the series are devoted to Bharatpur, Tadoba, Corbett, Bandhavgarh, Periyar and the Sundarbans National Parks. *The Kaziranga Inheritance* and its companion volumes in the series (some sadly now out of print) can be ordered online from www.sanctuaryasia.com, the website of India's premier wildlife and natural history magazine.

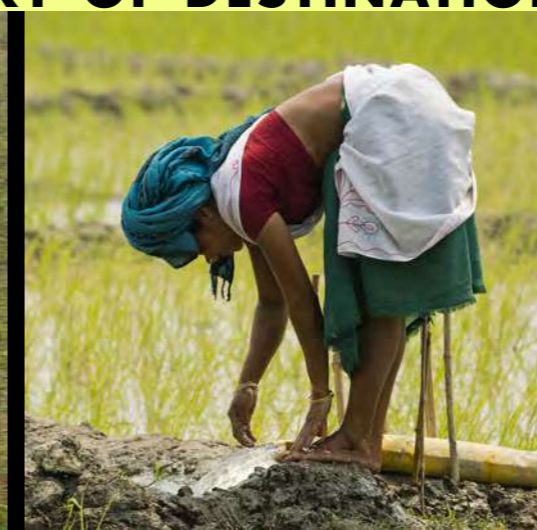


The Great Indian One-horned rhino *Rhinoceros unicornis* - Kaziranga's iconic species.



At-a-glance travel guide

COUNTRY OF DESTINATION: **INDIA**



USEFUL TIPS FOR YOUR EXPEDITION

Some simple, common sense, field-tested advice and information to make the best out of your trip and avoid hassles, worries and problems

ROUTE: Your flight - most probably originating from Delhi or Kolkata - will land at Jorhat Airport at Rowrah (97 kilometres/60 mi away) or Lokpriya Gopinath Bordoloi International Airport in Guwahati (approximately 217 kilometres/135 mi away). We suggest to have your guide and vehicle picking you up from there and then drive to your lodge of choice as public transport is usually noisy, very crowded and dangerously unpredictable.

MEANS OF TRANSPORT: The protected area can only be explored by 4WD drive vehicle (usually an open-back Gypsy, which is ideal for wildlife photography) or by forest department-managed

elephant rides (which we dislike but which allow visitors to approach rhinos very closely). Starting from the Park Administrative Centre at Kohora, jeep drives can follow the three motorable trails under the jurisdiction of three ranges—Kohora, Bagori, and Agaratoli. These trails are open for light vehicles from November to the end of April. Visitors are allowed to take their own vehicles when accompanied by guides, which is a great bonus for independent wildlife observation and photography.

CURRENCY: Indian Rupee, with Euros and USD being commonly accepted in upscale lodges. Remember to change a sizeable amount of cash

upon your arrival in India as you will not have many opportunities to do so later on in the countryside.

ACCOMODATION: There are currently many different options in the area, from cheap, low-grade hostels along the highway to upscale hotels. We can safely recommend the quaint, old-fashioned and somewhat aged **Wild Grass Lodge**, an atmospheric, pleasantly quiet, colonial-style lodge with good food and a wonderful bird garden, and which is relatively close to the main Park gate. The staff barely speaks any English and the food has to be laboriously ordered in advance - three times a day! - but the general feel of the place is quite lovely, really.

One of the world's legendary wildlife photography destinations



FOOD: Indian cuisine is one of the world's best, rivalling only with Italian or French for its richness of recipes and variety of ingredients. Do not be afraid to experiment - Indian food can vary from very mild to fiery hot, but it is always a fascinating sensorial experience.

LANGUAGE: Hindi and English (in the main cities).

WORRIES: None as long as you follow the Park's rules. Stepping out of the car is allowed at several vantage points and watchtowers, but remember always this is a wilderness where dangerous animals abound, so do not stray from your vehicle.

HEALTH: We never suffered any serious health problems in India, but it is always better to avoid street food of dubious origin and unbottled water, especially during transfers.

CLIMATE: The Middle Brahmaputra Valley is one of the rainiest places on earth, and Kaziranga gets around 250 centimetres (98 in) of rain per year, so the Park gets often flooded by the Brahmaputra for 5–10 days at a time, and around three quarters of the Western reaches of the Baguri area is annually submerged. The Park roughly experiences 3 seasons—summer, monsoon and winter. The dry and windy summer extends approximately from February to May with mean maximum and minimums of 37 °C (99 °F) and 7 °C (45 °F), respectively. The hot and humid Monsoon season extends from June to September. During the monsoon - when the Park is closed to visitors - Kaziranga receives mean rainfall of 2,220 millimetres (87 in). The winter, extending from November to February, is mild and dry, with the mean maximum and minimum being 25 °C (77 °F) and 5 °C (41 °F), respectively.

BESIDES: Indian bureaucracy can drive one mad, and Kaziranga is no exception - the Park can be unexpectedly closed for seasonal, animal census or other extraordinary reasons, so always check in advance what is going on at its [official site](#) before planning your visit. Assam must have been an incredibly beautiful place before the British invaders occupied it, razing to the ground its immense, untouched forests to make room for their highly profitable commercial tea estates. Tea lovers will have a field day here, with the possibility of buying their brew of choice (and many different wonderful spices too) from several organic, low-impact cultivations of very high repute such as Hathikuli Organic/Amalgamated Plantations. But besides tea, Assam has much more to offer - at the very least the Hoollongapar Gibbon Sanctuary, Manas NP, and one wonderful birdwatching site, Maguri *bheel* (or Maguri lake) at Dibru Saikhowa National Park. ●

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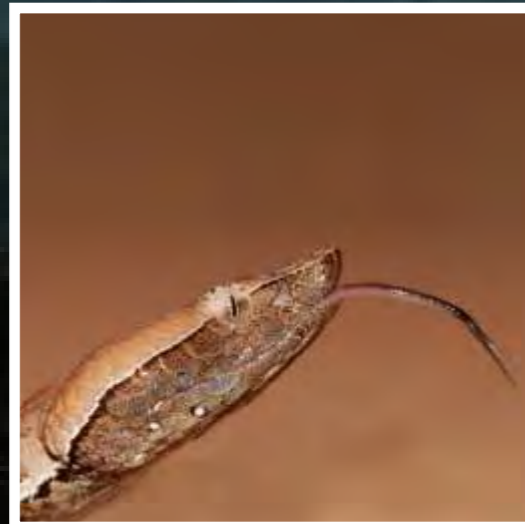
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Experience the wilderness in India's Western Ghats

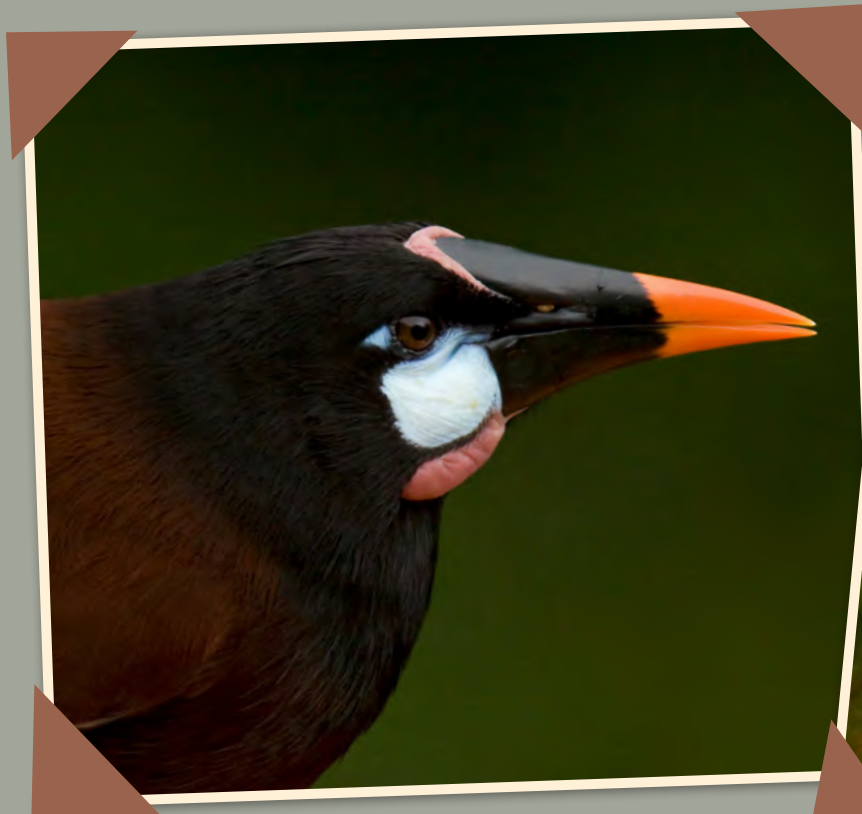


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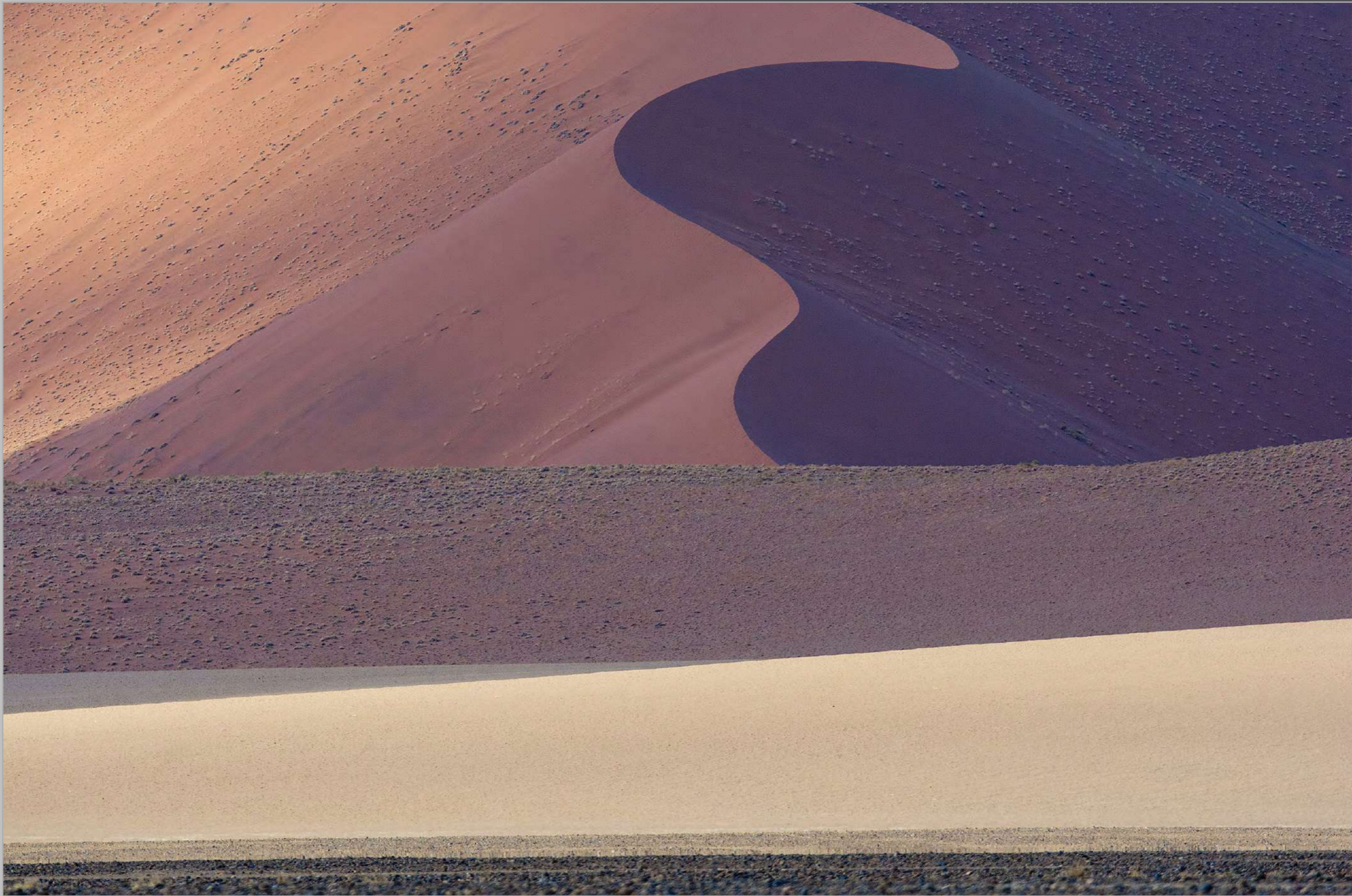
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A landscape photographer's dream land with its red and orange towering dunes and the ever-changing play of light and shadow upon them



Access to the Sossusvlei area of the Namib-Naukluft National Park is from the Sesriem gate, which is located in the surroundings of the eponymous canyon. From Sesriem, a 60 km tarmac road leads to Sossusvlei proper.



TEXT BY ANDREA FERRARI
PHOTOS BY ANDREA & ANTONELLA FERRARI

Namibia's Sossusvlei embodies some of the planet's most spectacular landscapes, and its desert environment is a photographer's paradise where dramatic colors, patterns and light reign supreme. It has seen to be believed - the chromatic shades of the gigantic dunes can change completely from one second to the next, in a dizzying and endless carousel of shifting colors and light-and-shadow patterns. In its strictest sense, Sossusvlei (sometimes written Sossus Vlei) is a salt and clay pan surrounded by high red dunes, located in the southern part of the Namib Desert, in the Namib-Naukluft National Park. The name "Sossusvlei" is however often used in an extended meaning to refer to the surrounding area (including other neighbouring vleis such as Deadvlei and other high dunes), which is one of the major visitor attractions of Namibia. The name itself is of mixed origin and roughly means "dead-end marsh". *Vlei* is the Afrikaans word for "marsh", while *soossus* is Nama for "no return" or "dead end". Sossusvlei owes this name to the fact that it is an endorheic drainage basin (i.e., a drainage basin without outflows) for the ephemeral Tsauchab River. The Sossusvlei area belongs to a wider region of southern Namib with homogeneous features (about 32.000 km²) extending between rivers Koichab and Kuiseb. This area is characterized by high sand dunes of vivid pink-to-orange color, an indication of a high concentration of iron in

the sand and consequent oxidation processes. The oldest dunes are those of a more intense reddish color. These dunes are among the highest in the world; many of them are above 200 metres, the highest being the one nicknamed Big Daddy, about 325 metres high; however, the highest dune in the Namib Desert area, Dune 7, is about 388 metres high. The highest and more stable dunes are partially covered with a relatively rich vegetation, which is mainly watered by a number of underground and ephemeral rivers that seasonally flood the pans, creating marshes that are locally known as *vlei*; when dry, these pans look almost white in color, due to the high concentration of salt. Another relevant source of water for Sossusvlei is the humidity brought by the daily morning fogs that enter the desert from the Atlantic Ocean. Fauna in the Sossusvlei area is relatively rich, comprising several small animals that can survive with little water, including a number of arthropods, small reptiles and small mammals such as rodents or jackals; bigger animals include antelopes (mainly oryxes and springboks) and ostriches. During the flood season, several migrant bird species appear along the marshes and rivers. Much of the Sossusvlei and Namib fauna is endemic and highly adapted to the specific features of the Namib. Most notably, fog beetles such as the Namib Desert Beetle have developed a technique for collecting water from early morning fogs through the bumps in their back. ●

A classic shot taken daily by hundreds of visitors - and yet each image is unique and completely different from the others, as light conditions continuously change.

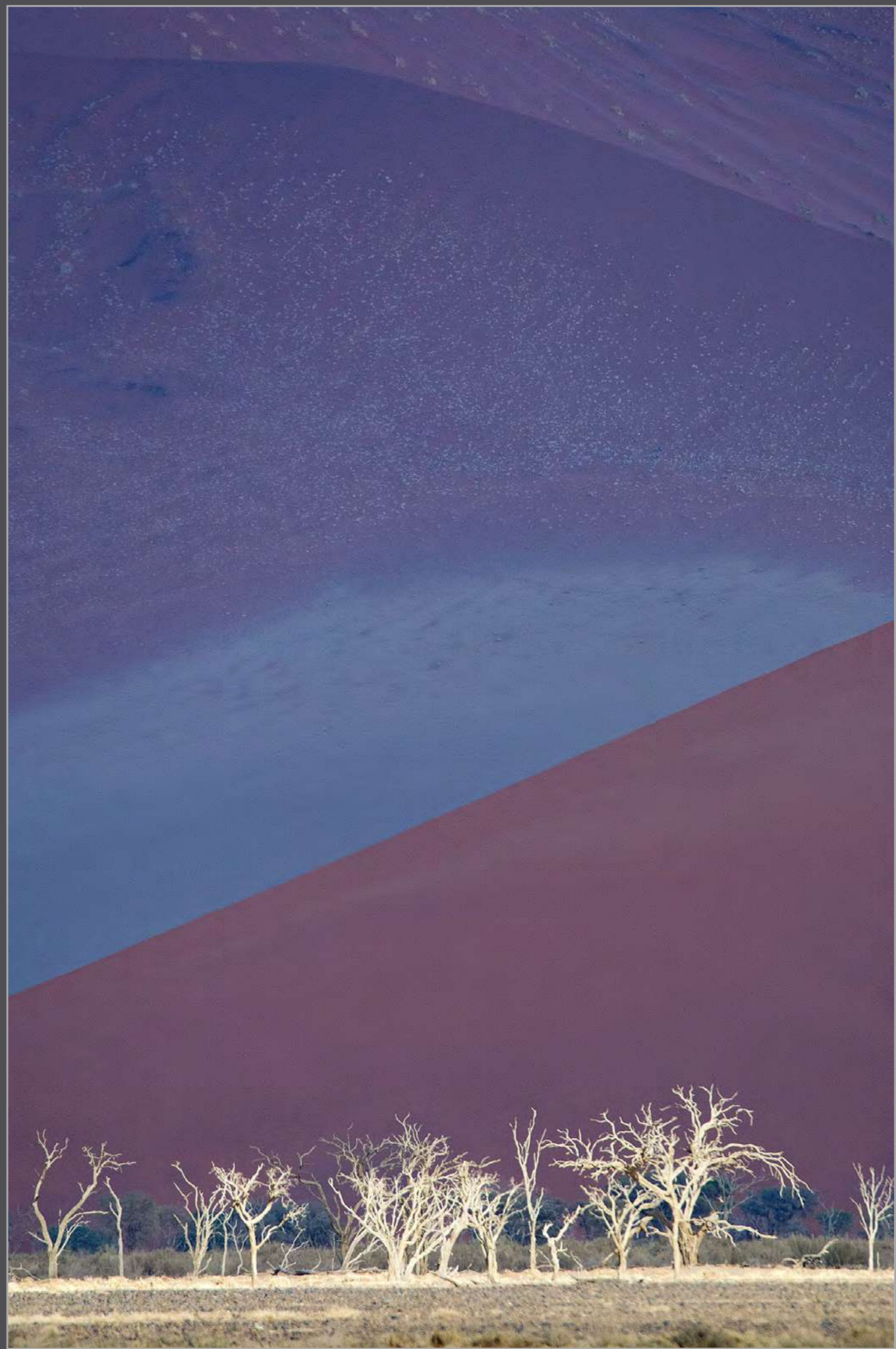
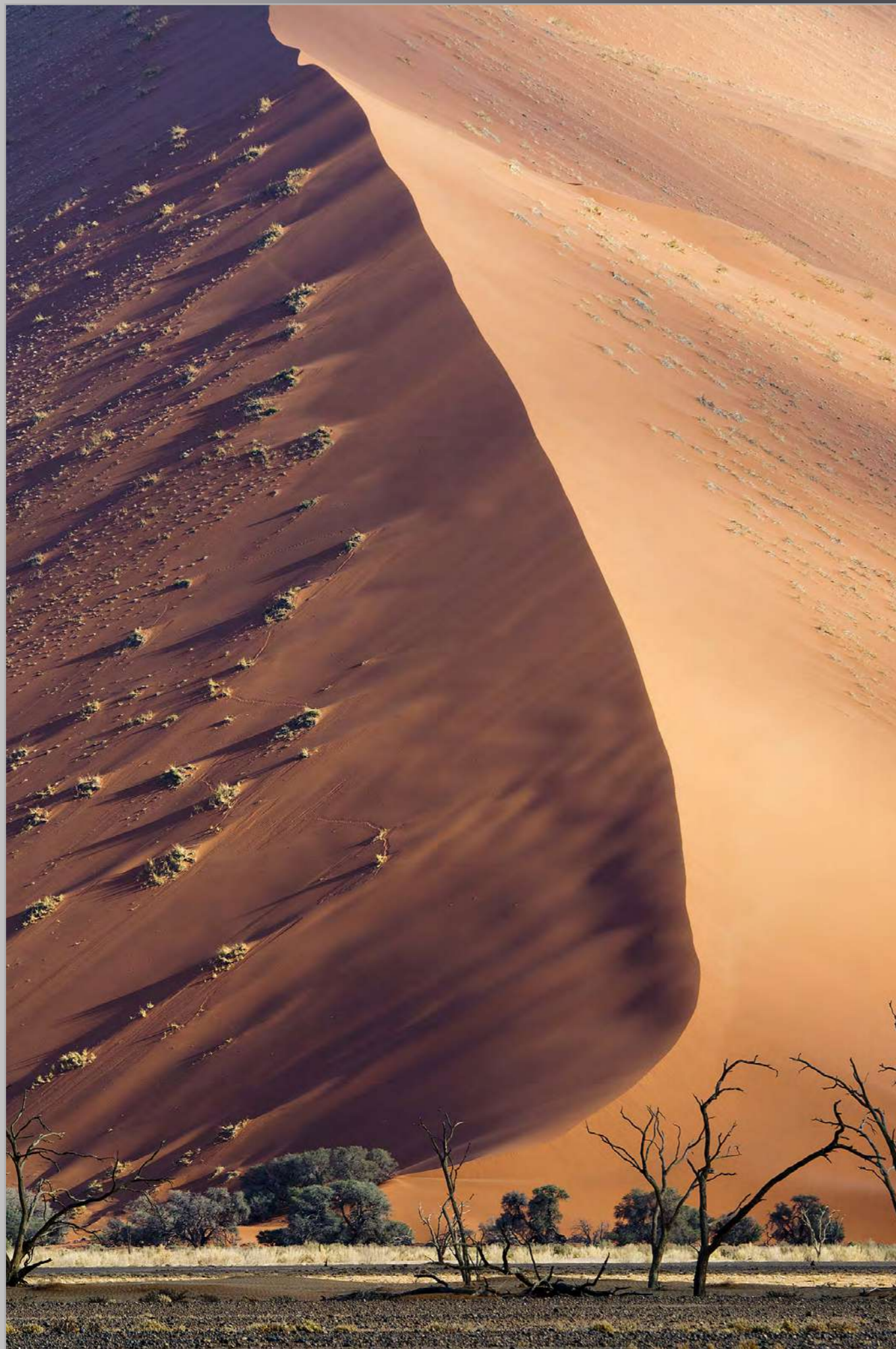


The Sossusvlei area is characterized by high sand dunes of vivid pink-to-orange color, an indication of a high concentration of iron in the sand and consequent oxidation processes. The oldest dunes are those of a more intense reddish color, but their color's perception changes with light conditions.



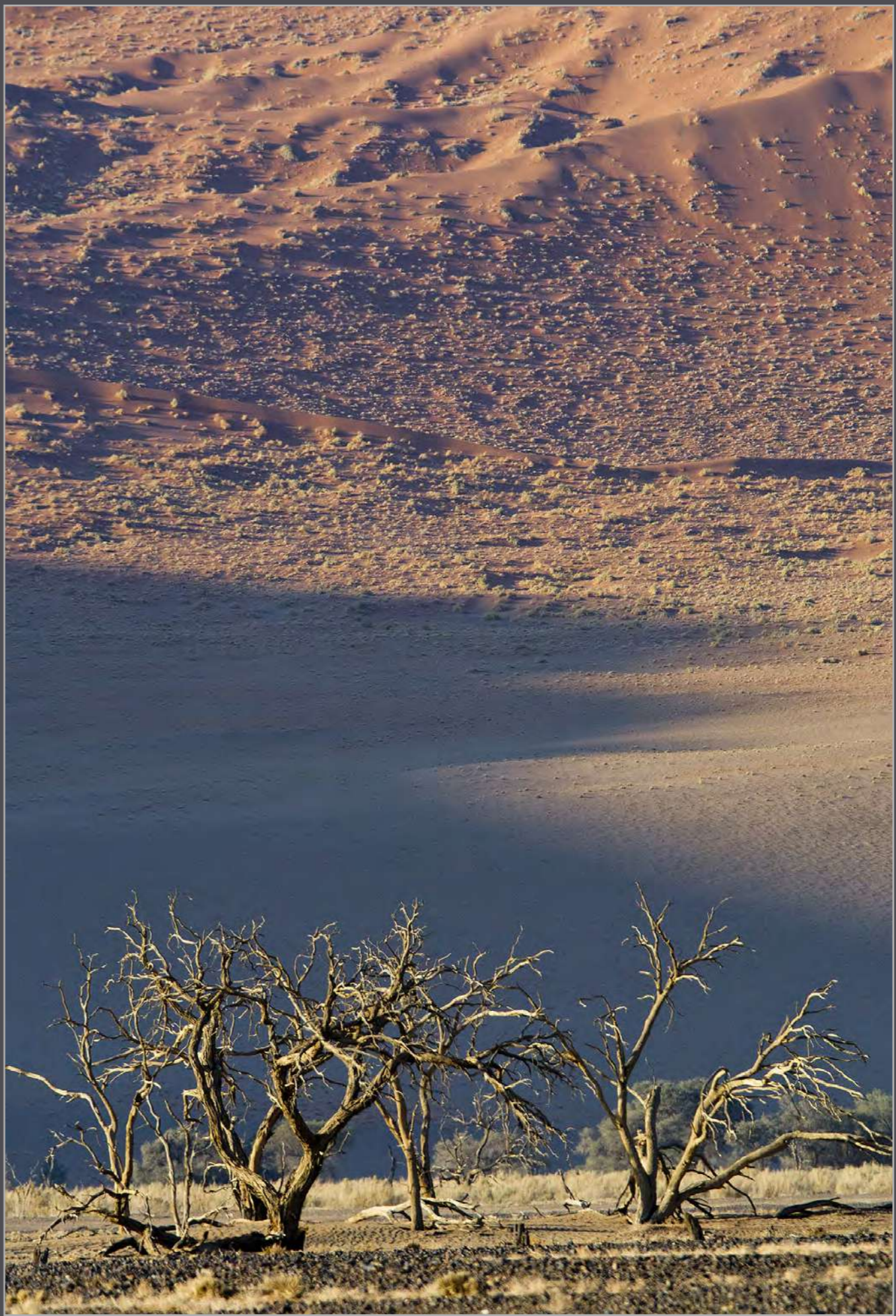
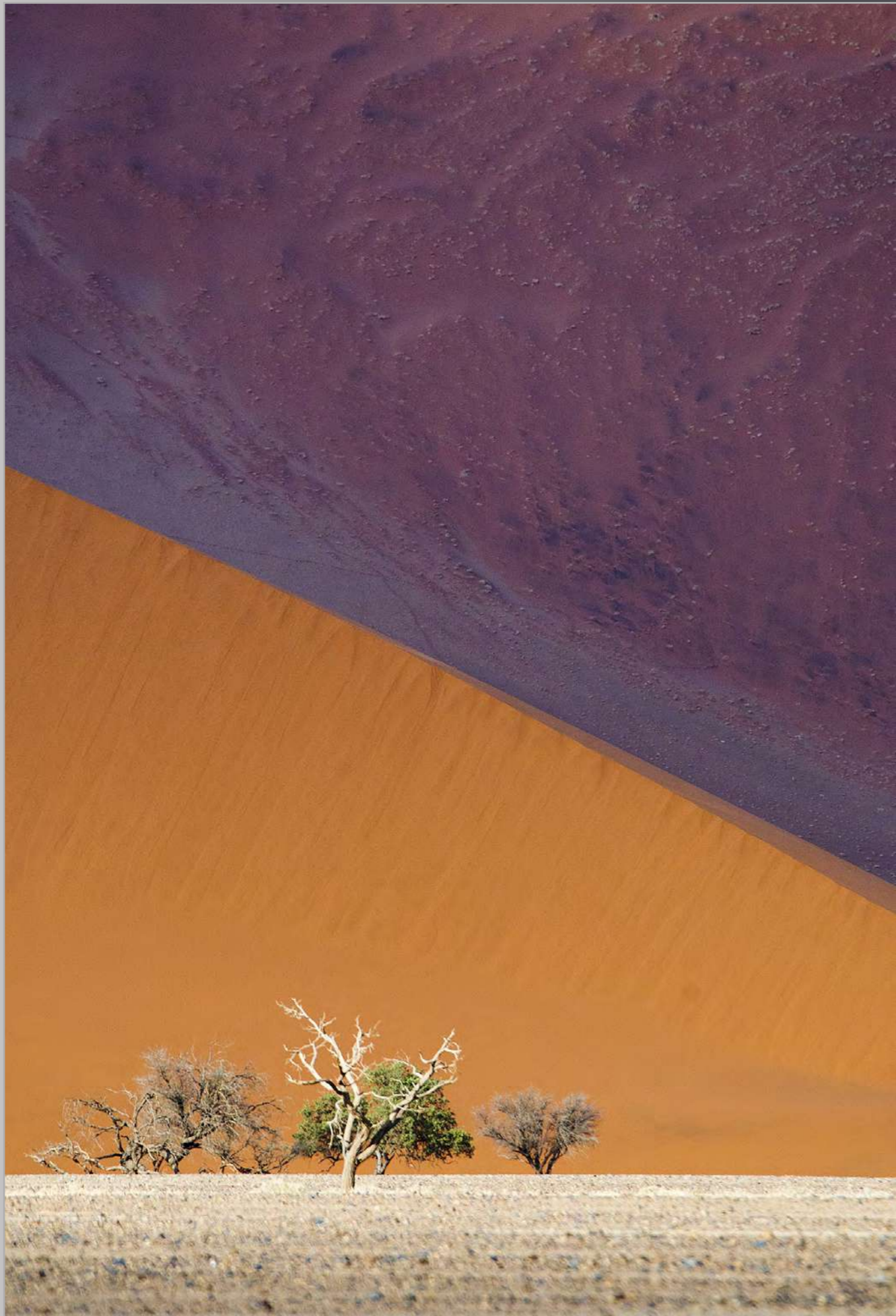


Due to its surrealistic landscapes, Sossusvlei is one of the most photographed places in Subsaharan Africa. The area has been the setting of a number of commercials, music videos, and movies, especially of the fantasy genre; one of the most well-known examples is the thriller *The Cell* (2000) starring Jennifer Lopez.





Deadvlei is another clay pan, about 2 km from Sossusvlei. A notable feature of Deadvlei is that it used to be an oasis with several acacia trees; afterwards, the river that watered it changed its course. The pan is punctuated by blackened, dead acacia trees, in contrast to the white of the salty floor of the pan and the orange of the dunes.





Since Sossusvlei is possibly the foremost attraction of Namibia, much has been done by the Namibian authorities to support and facilitate tourism in the area. The asphalt road was built in the early 2000s to connect Sesriem and Sossusvlei's 2x4 parking, and it is one of the very few non-urban metalled roads in Namibia.



Numerous places of accommodation are found along the border of the National Park, between Sesriem and the nearest settlement, Solitaire. Recently, accommodation has been built inside the Park. It is also possible to take scenic flights over the dunes, either with small planes or in hot air balloons.





Deadvlei is a white clay pan located near the more famous salt pan of Sossusvlei. Also written DeadVlei or Dead Vlei, its name means "dead marsh" (from the Afrikaans *vlei*, a lake or marsh in a valley between the dunes). The pan also is referred to as "Dooie Vlei" which is the fully Afrikaans name.

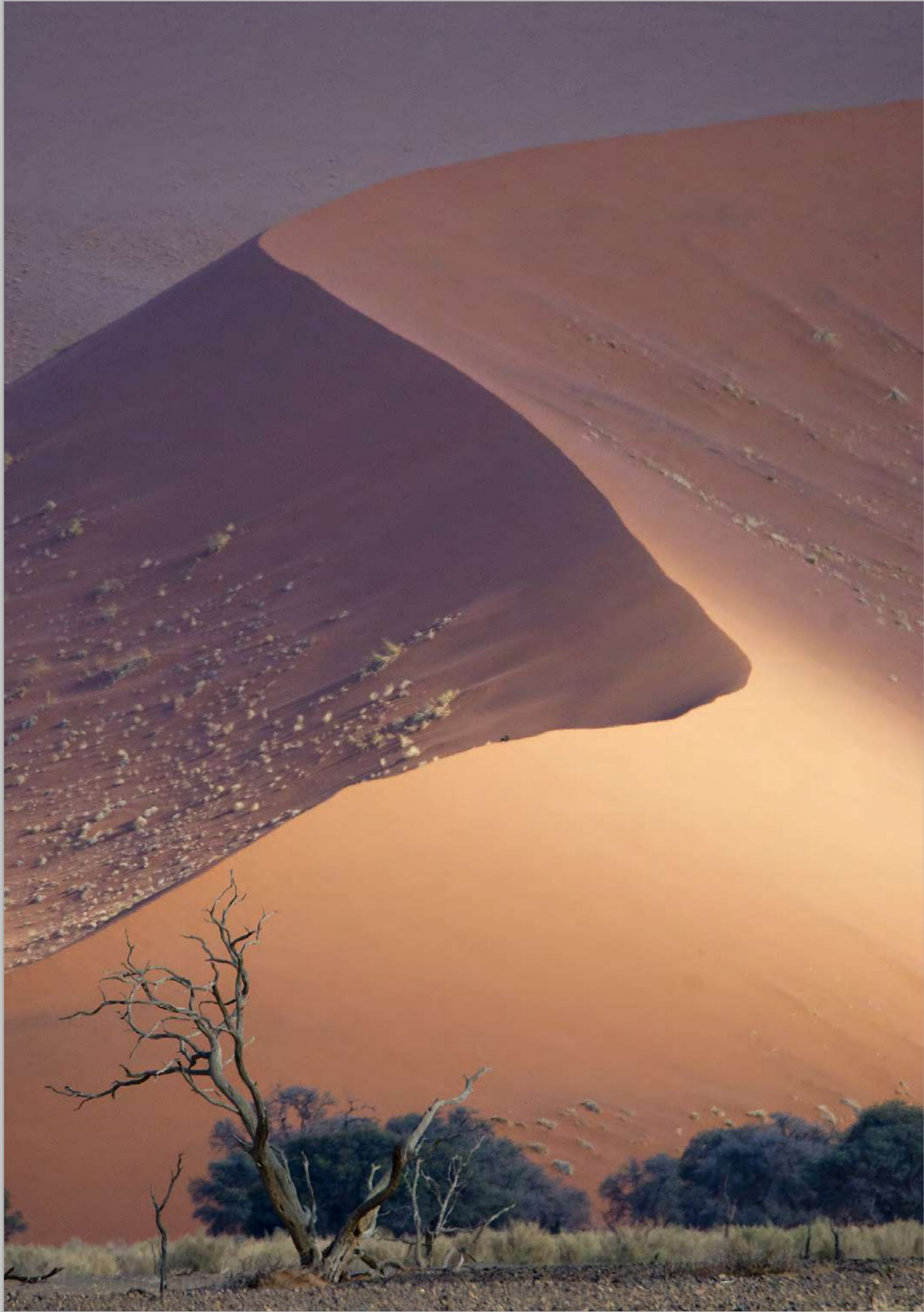


Deadvlei has been claimed to be surrounded by the highest sand dunes in the world, the highest reaching 300–400 meters (350m on average, named "Big Daddy" or "Crazy Dune"), which rest on a sandstone terrace.





The barren, arid, hostile environment of the Sossusvlei is home to several beautiful species, including relatively large-sized grass-eaters such as Oryx and Springbok. This is a Gemsbok *Oryx gazella*.





“Squashing” perspective by the use of a telephoto or a zoom in the 80-400mm range will provide interesting photographic results when portraying the ever-changing play of light and shadow in the dunes of Sossusvlei.



A small herd of Gemsbok *Oryx gazella* - notice the juveniles at the right.



Cape sparrow or mossie *Passer melanurus*.



Greater Kestrel or White-eyed Kestrel *Falco rupicoloides*.



The relatively sparse vegetation at the feet of the gigantic dunes and the skeleton-white dead tree trunks littering the landscape offer mesmerizing visual variations to the barren desert environment of the area.



Both wide angle and zoom lenses can be used with brilliant results here - our preference goes to the latter however, as zooms allow to isolate landscape details without having to keep the sky, a distracting factor in this case, in the frame.



The Sossusvlei towering sand dunes along the tarmac road offer unique camera opportunities thanks to their ever-changing play of light and shadow. This is a place where even raw amateurs can get spectacular photographic results during a single day visit.





Driving along the tarmac road offers unique photographic possibilities, as the light and color patterns on the surrounding sand dunes changes constantly. In fact, one could spend the whole day in a single spot and without shooting the same image twice.

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Photographers from 30 countries have taken part in Global Arctic Awards 2014. The project was fulfilled with the support of the government of the Yamal-Nenets Autonomous region and the Russian Geographic Society.

The hard task was put to the international jury members (Sergey Anisimov/Russia, Alessandra Meniconzi/Switzerland, Bryan Alexander/England, Sergey Gorshkov/Russia, Joshua Holko/Australia, Michelle Valberg/Canada). But the choice has been

done, the winners have been announced and can now be seen on the competition web site:

http://arcticawards.ru/index.php?route=information/bestwinners§ion=Global_Arctic_Awards&year=2016

The contest winners have been awarded the medals of international photography associations FIAP, PSA and UPI, as well as with prizes and gifts from Global Arctic Awards competition partners.

The Global Arctic Awards organizers contest express their sincere gratitude to the partners and sponsors, whose support has played a very important role.

Contact information:

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**Arctic whale
dance**

FIAP Gold medal
Audun Rikardsen,
Norway

Previous page:
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PSA Silver medal
Benoist Clouet,
France

Polar Bear
Mother
PSA Gold medal
Roie Galitz,
Israel





Cold surface
PSA Silver medal
Audun Rikardsen,
Norway

Gentoo
Family Love

GPU Gold
medal
Roie Galitz,
Israel





Best friends

PSA Bronze medal Dmitry Arkhipov, Russian Federation



Face to face
PSA HM
Dmitry Arkhipov,
Russian
Federation



**Common
Guillemot**
GPU HM
Arnfinn
Johansen,
Norway



**Gaming
in B/W**

PSA HM
Gilles Laurent,
France

**Kittiwake
dream**
GPU Gold medal
Arnfinn
Johansen,
Norway



**Polar bear
in winter
flames**
FIAP Gold
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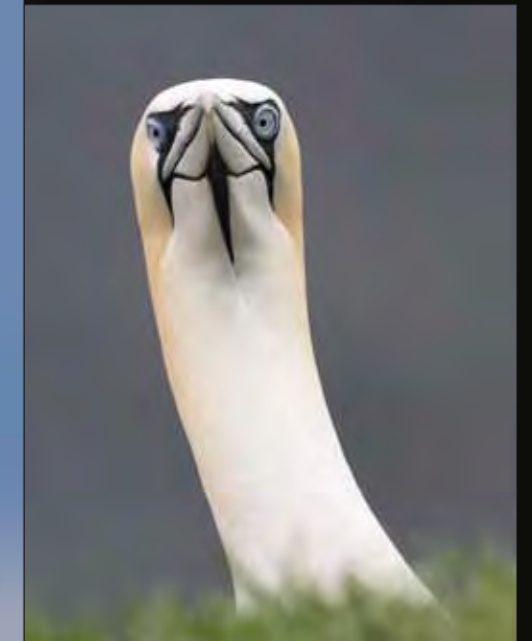
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"My experience was EXCEPTIONAL! The trip exceeded my expectations in all areas. I hoped to get in a position to see owls and couldn't possibly have been happier. It was abundantly clear that David invested significant time and effort prior to the arrival of the group in scouting the area around Quebec and Ontario. He knew exactly where to go to find every species of owl. His knowledge and efforts were very much appreciated by the entire group. My primary objective was just getting in a position to photograph owls and was not expecting much in the way of photographic instruction. I was very pleasantly surprised and was very happy with the instruction. Prior to the trip I had a love/hate relationship with auto focus as it applies to photographing birds in flight. I've struggled with this for years. While I have a lot more to

learn, and need to work at honing my skills, the trip with NPA helped me tremendously in being able to photograph birds in flight. Photographing birds in flight was my main objective. Prior to the trip I was nearly clueless in comparison to my skills after the trip. You can also see from my bird list that I found the trip productive from a birding perspective as well".
Kevin McCarthy, USA

"I recommend NPA workshops! The level of services by workshop leaders was excellent. Quality of photographic instruction was exceptional and they

were always on hand to solve issues that arose, and I had more than my share of equipment issues. Quality of wildlife provided was good and I was amazed at how easily the subjects accepted new setups provided. Locations visited were right on for the species targeted. My most memorable moment was using the flash setups the first time and capturing an image of the Swordbill Hummingbird. I feel that my level of photography has improved with the custom functions that were set up on my camera for me and the resulting images that I obtained. Overall experience and

expectations were achieved and we were fortunate to have a very compatible group on our tour, which made it very enjoyable. This was my first workshop and I would recommend them to friends".
Rosemary Harris, Canada

"Great trip, great experience and great workshop leader. Great opportunity for capturing images of magnificent and uncommon (in southern USA) birds. Organizers contribute to great group dynamics and superb attitude. Cool techniques".
Eric Grossman, USA



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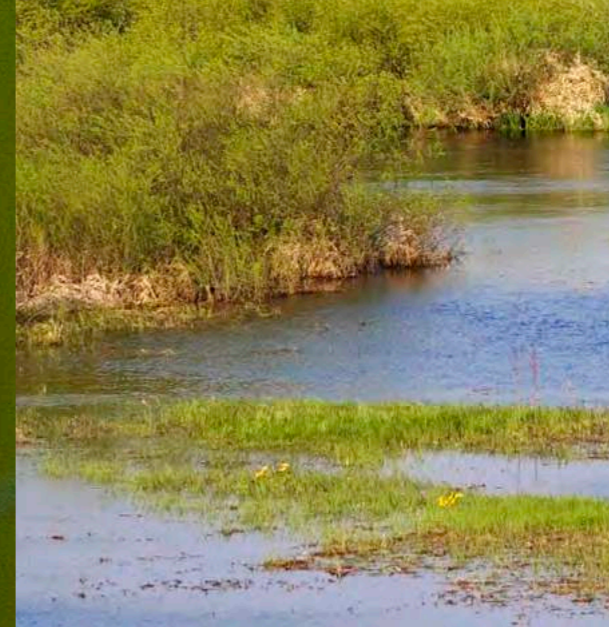
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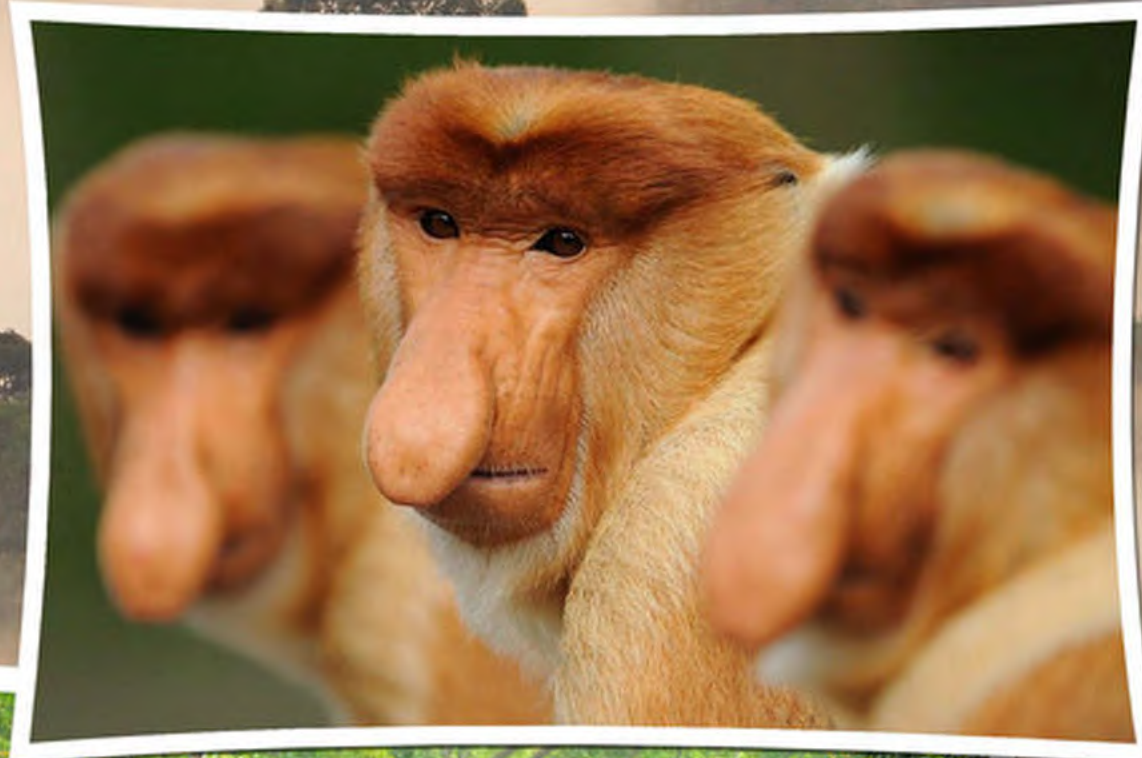
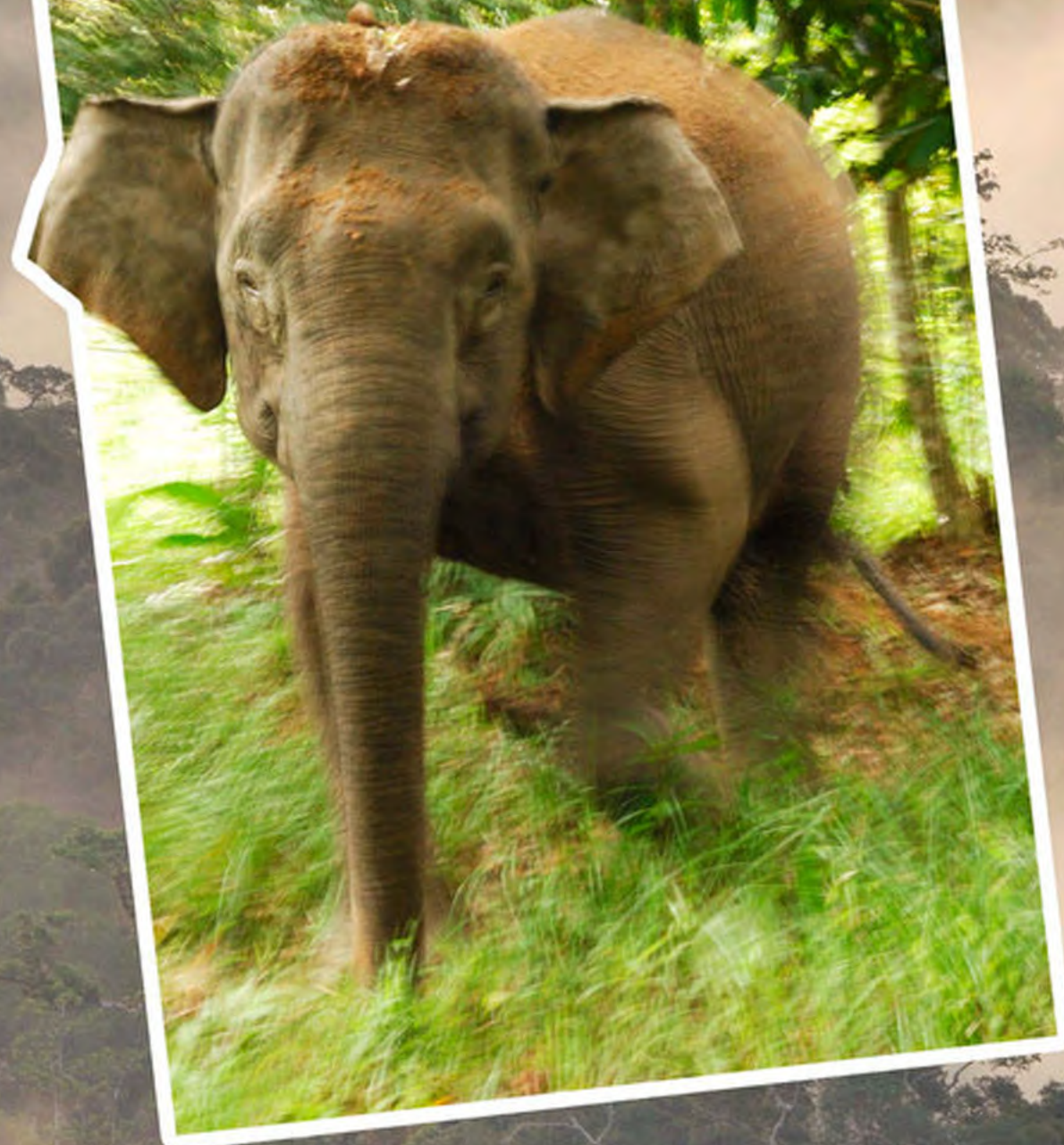
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CHINA'S MYSTERIOUS CAVEFISHES

Field researcher and passionate conservationist Danté Fenolio reports on the little-known, highly adapted and currently endangered fauna of South China's karst





Cone Karst in Guangxi, China. At times the peaks in South China seem to compete for space and are densely bunched together (cone karst or *fengling*). At other times, the peaks are discrete entities and do not touch one another – falling into the tower karst or *fengcong* category. The two are related in that they represent different stages in the same process. Tower karst evolves from cone karst as water undercuts the limestone through time.



The Small-eyed Barbel *Sinocyclocheilus microphthalmus* photographed *in-situ*. The same species is featured on the opening page of our story.

TEXT BY DANTÉ FENOLIO, PH.D. – VICE PRESIDENT OF CONSERVATION AND RESEARCH, SAN ANTONIO ZOO
 MATTHEW NIEMILLER, PH.D. – ILLINOIS NATURAL HISTORY MUSEUM
 DAPHNE SOARES, PH.D. – NEW JERSEY INSTITUTE OF TECHNOLOGY, FEDERATED DEPARTMENT OF BIOLOGICAL SCIENCES

ANDY GLUESENKAMP, PH.D. – DIRECTOR OF CONSERVATION AND RESEARCH, SAN ANTONIO ZOO
 PROSANTA CHAKRABARTY, PH.D. – LOUISIANA STATE UNIVERSITY MUSEUM OF NATURAL SCIENCE
 YAHUI ZHAO, PH.D. – INSTITUTE OF ZOOLOGY, CHINESE ACADEMY OF SCIENCES

W

e headed into the field at dawn. The drive took us closer and closer to a dense cluster of high limestone peaks, ultimately following a road among them. This was an area of South China we had visited before. We were all excited – it is exceptionally remote and with few people. The region is riddled with caves. Unbelievably tangled clusters of vegetation grow on the nearly vertical slopes. Birds, infrequently encountered elsewhere, are commonplace again and small mammals occasionally dash across the road and into the thick roadside vegetation. As we climbed the steep terrain, the road began to twist back and forth – it was cut from a sheer cliff face and ultimately had drop-offs that were 800 to 1000 feet above the valley floor. The width of the road was hardly more than the width of our vehicle. Any mistake driving this route would end badly, but we have gained great confidence in our driver during the past five or so expeditions to South China. He is the real deal - a professional. After fifteen or so miles, the road turned into a muddy, rutted mess. A short distance farther and we arrived to an old house made of weathered adobe. The aged structure was sheltered from the sun by an even older looking roof of worn, handmade clay tiles.

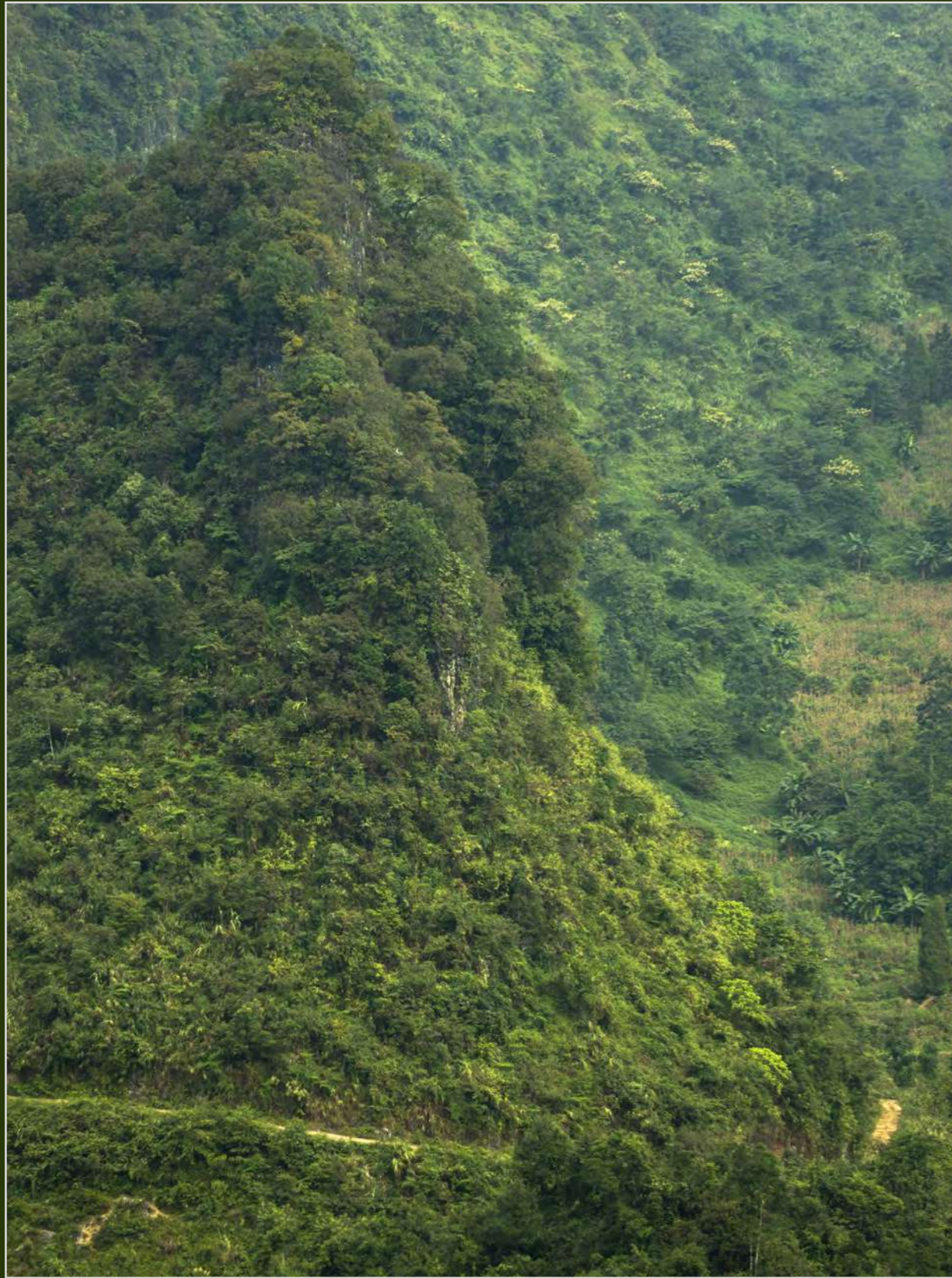
PHOTOS
 BY DANTÉ FENOLIO

We would traverse the rest of the route on foot. The locals greeted us warmly. A year ago, they had told us that there was a population of cavefish in nearby cave streams. On this visit they provided our colleague, Dr. Yhaui Zhao, with a gift upon our arrival: a cavefish preserved in alcohol. We watched as Yhaui held up the clear bottle of alcohol and stared at the slender, eyeless fish. He was amazed with the find and was overwhelmed with excitement. We prepared for a wet cave trip and started toward the massive karst tower in front of us. The trail was a steep one that wound its way into a carved valley. At the base of the valley, a cave mouth was visible through the vegetation as a dark, circular shadow. Cold air billowed from the cave mouth and we made our way down muddy and rocky slopes to a stream below. With an underwater housing and camera, we were able to photograph cavefish where they live...oh what a rush – to capture these animals in their element. (As an FYI and before we move on, the accepted ichthyological plural of fish is “fishes” when referring to multiple species). The term “cavefishes” conjures up visual images of pink and blind animals that almost defy reality in appearance and Southeast Asia has many species. In fact,

continued on page 107 ➤



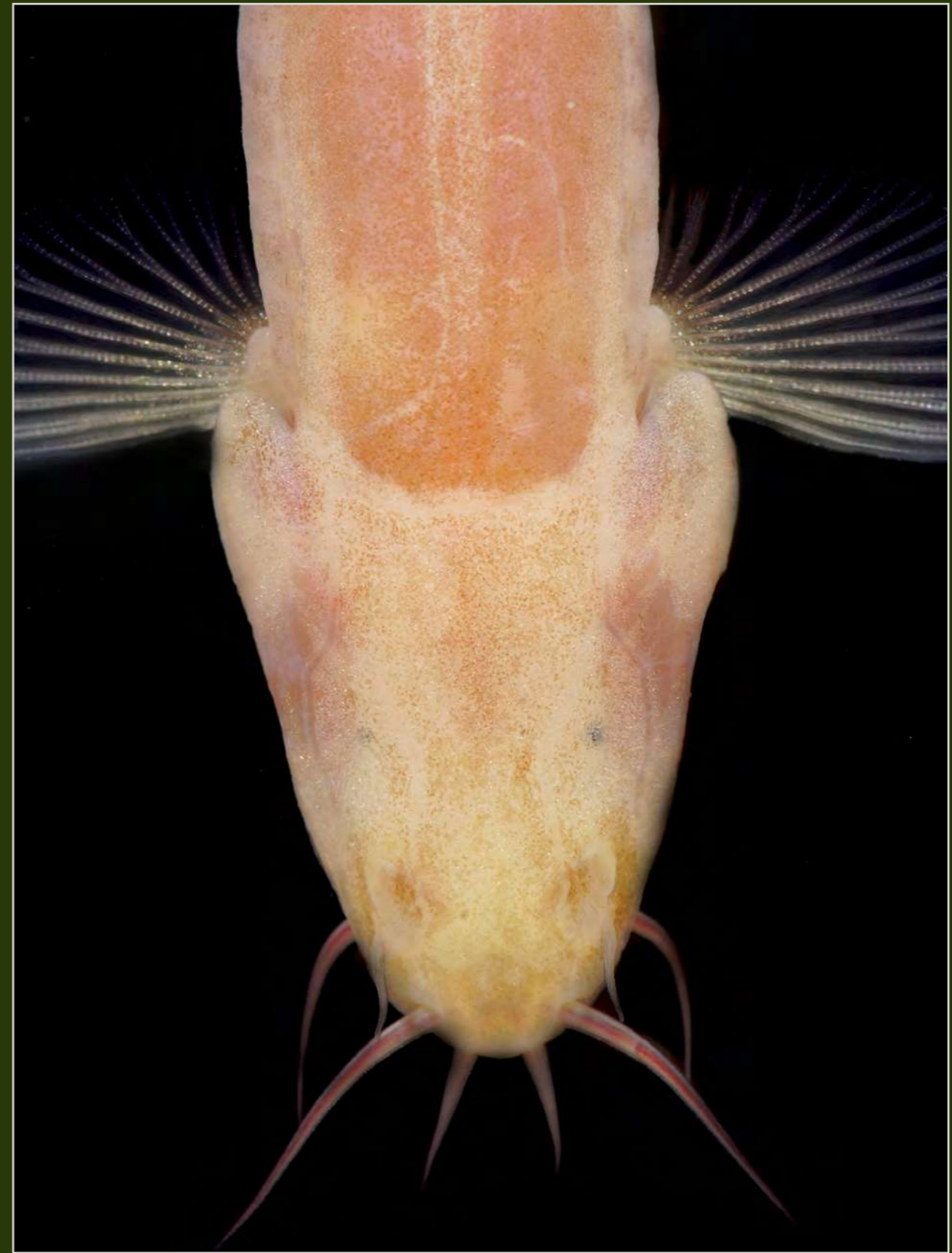
The Asiatic watersnake *Sinonatrix aequifasciata* can be found inside of caves, sometimes well beyond the twilight zone.



Many roads in China's karst region traverse steep and difficult terrain. Continued exploration of subterranean habitats in Southeast Asia is critical to protecting the species that live there. Documentation of the distribution and diversity of cave species identifies "biodiversity hotspots" which can then be targeted for protection.



The Taiji Cave Loach *Oreonectes anophthalmus* is seriously threatened by overcollection and agricultural runoff at the only known locality.



Oreonectes macrolepis retains vestigial eyes and some skin pigmentation.



The Golden Line Barbel *Sinocyclocheilus furcodorsalis* photographed *in-situ*.



Top, caving skills are required to work in many of the caves the CCWG has been investigating. Bottom, fish traps are often used to collect fish in caves.

defining cavefishes is something that requires explanation in a place as diverse as Southeast Asia. Some definitions will help here. Animals that live exclusively in caves or groundwater are known respectively as *troglobites* (or *troglobionts*) and *stygobites* (or *stygobionts*). Troglonbionts live on the land, stygobionts in the water. The terms are associated with species that are highly adapted for life in subterranean habitats and are found no place else. The adaptations of cave-inhabiting species come in a variety of forms that are not expressed the same way in all species. Think of each character, like eye size, as a variable on a sliding scale. As a species evolves in conjunction with a subterranean existence, the size and degree of development of its eyes, for instance, tends to slide down the scale (again, not observed in every species). These changes happen over time and across generations, not in individuals. The same can be said of other key characters such as degree of pigmentation, body size, body length and girth, mouth shape and size, and forehead shape and size. Obligate subterranean fishes in China generally, but not always, show some modification in these characters. When these characters are expressed, they are considered *trogomorphic* characters, or characters associated with life below ground. Some subterranean species develop structures not found in their relatives that live in surface habitats, and scientists are not always certain of their function. The Chinese Barbels, for example, inhabit both surface streams and subterranean waters. The cave-inhabiting

species exhibit varying degrees of adaptation for that environment, and some have mysterious structures. For example, the Horned Golden Line Barbel, *Sinocyclocheilus tileihornes*, has a structure protruding from its forehead that looks very much like a horn. Other cave-inhabiting species have massive bumps on their foreheads and or a flattened, duck-billed mouth. We assume that the structures have something to do with life in the dark, but we do not know their exact function yet. Just as with the other characters mentioned above, these structures exist on a continuum; that is, they are expressed more strongly in some species than in others. There are many cavefishes in China that are only found in groundwater but that have differing expression of the characters mentioned above. The blind and pink fish found in the region are abundant and well represented. Loaches (families *Nemacheilidae* and *Cobitidae*) and barbels (family *Cyprinidae*) dominate the ichthyofauna of these subterranean waters – but there are exceptions. One is a blind and pink catfish, described only three years ago, SE Asia’s first “blindcat.” But back to defining cavefishes in SE Asia...the tricky part is how you describe the rest of the fishes that inhabit caves for at least part of their lives. For example, there is an assemblage of species that live in cave streams during the day but feed in productive surface waters under the cover of darkness, not unlike the ecology of cave inhabiting bats. These fishes typically have fully functional eyes and

continued on page 112 ➤



Hand netting of fishes is a preferred method when conditions are suitable.



Above, photography of subterranean species is a big part of the documentation process. The Chinese Cavefish Working Group has put a lot of effort into capturing images of cave organisms where they occur and *in-situ* (image by Daphne Soares). Right, cave formations are commonplace in South China's caves.



One of the oddly-shaped groundwater loaches, *Triplophysa huanjiangensis*, has an elongate head and face. This is *Triplophysa huanjiangensis* photographed *in-situ*.



The Tile-like Horned Barbel *Sinocyclocheilus tileihornes* has an interesting structure protruding from its head. No explanation for the function of this structure has been identified.



China is a complicated mosaic of ethnic groups with distinctive languages, customs and identities, and many of these groups retain their cultures today.

pigment; however, they depend on subterranean habitat for their survival. They are as tied to subterranean waters as their blind and depigmented relatives that never leave permanent darkness. Certainly, both groups qualify as cavefishes. The karst region (area that has an appropriate geology for cave formation) of SE Asia is larger than the state of Texas (USA) and boasts the greatest diversity of obligate subterranean fishes anywhere in the world. In China alone, there are no fewer than 130 species dependent on subterranean waters. There are also *troglophiles*, species that readily inhabit subterranean waters when they are available. This includes a host of catfishes and cyprinids not typically considered cavefishes because they also occur in surface water, far from caves. These species can complete their entire life cycles in surface habitats but a few might also be able to do so in subterranean habitats. Our drive home took us past the loud and unmistakable clanging of excavators breaking up limestone to be hauled off to concrete plants and tile factories. Even in the most remote corners of China, the harvest of limestone is big business and, in part, fuels the burgeoning development seen across the region – one of many significant threats to subterranean wildlife of the area. Other major threats include overuse of groundwater for agriculture and contamination from runoff, threatening entire subterranean ecosystems. Additional threats lurk in the contemporary exploitation of cavefishes in SE Asia. For example, we surveyed a

cave and its river that we had previously visited in 2011. Back then, it was a beautiful cave with few signs of human visitation. The river boasted a healthy population of one of the cavefishes you see here, the Golden Line Barbel, *Sinocyclocheilus furcodorsalis*. During our visit this year, we found evidence of intensive harvest of this species. Locals told us why they had been harvesting the fish (for the aquarium trade) and even who they were selling them to. We saw gill nets and nets of every other variety strewn along the waterway – some in places where they could continue to trap fish. Fish captured this way would then simply die in the unattended nets. Trash now litters the cave, and there are signs of camps where fishermen burn candles and prepare food as they wait on their traps. The income from harvesting these fish is just too much of a temptation for locals and, in all truth, primary blame should not be placed on them. However, there is no excuse for unsustainable commercial collection of fish for the aquarium trade. Companies selling fish for the trade (and buying from these locals) need to avoid subterranean species – or we will lose this biodiversity in the blink of an eye. Cavefishes are particularly susceptible to overharvest. We are working on population studies but they are difficult to conduct under such circumstances. This cave was going to be one of our study sites. We encountered *no* fish on our recent visit. The locals told us that few had been seen in several years but they used to catch them “*all the time and on each visit.*” In

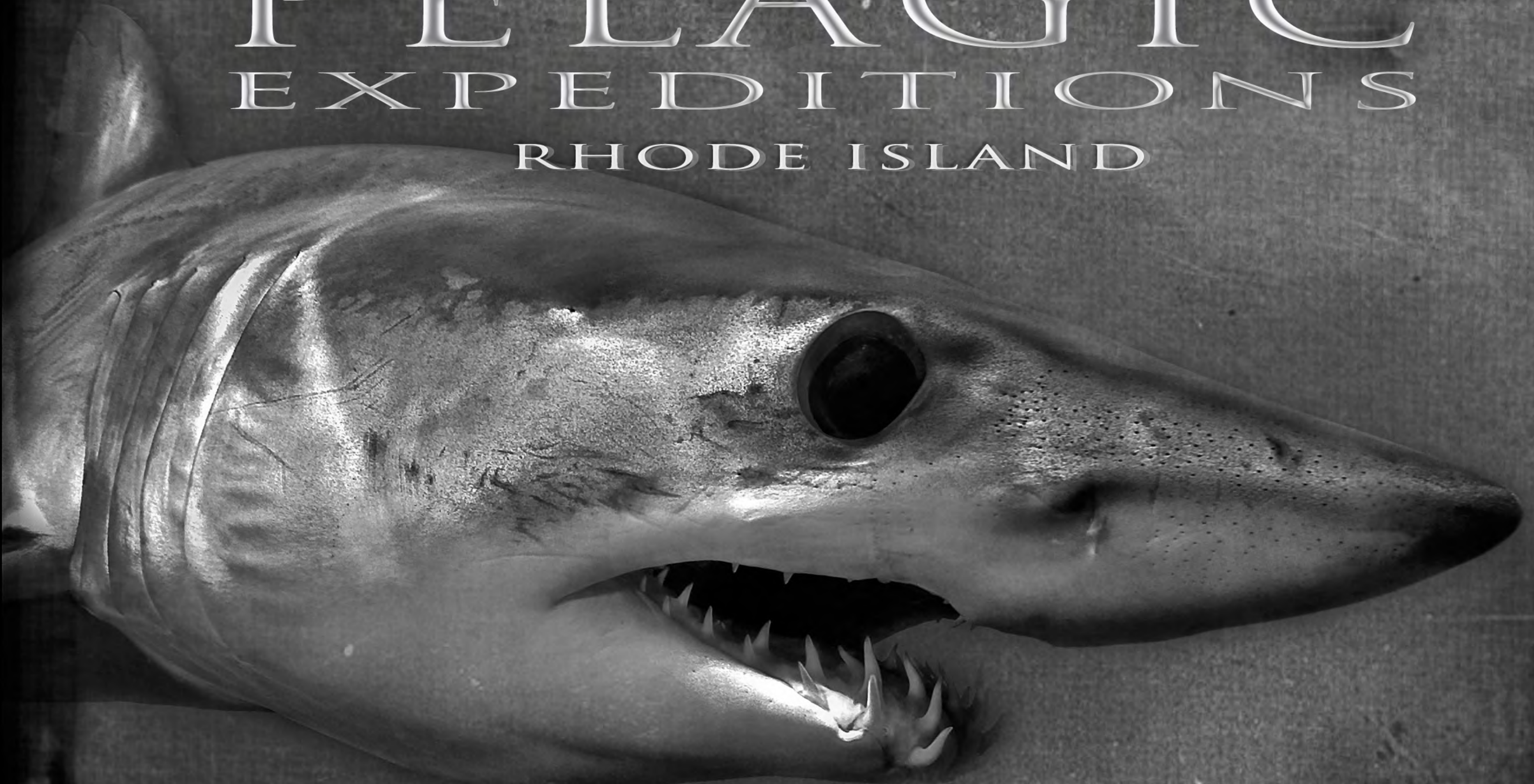


Top, Frogs of the genus *Odorana* are troglophiles and some species are only known from caves. Bottom, close-up of a Tile-like Horned Barbel *Sinocyclocheilus tileihornes*.

2011, we observed many dozens. Because of their unique ecology and limited population sizes, the vast majority of cavefishes worldwide cannot withstand commercial harvest (Mexican Cave Tetras are farmed in Florida, USA, for the aquarium trade). Preliminary evidence strongly suggests that most populations of cavefishes in China are highly localized, vulnerable to commercial collection, and easily removed. While it may be technically legal to capture and sell some of these species in China, it is not ethical. Too frequently, abuse of wildlife and wild places happens under the guise of “well, it’s legal,” but that does not make it ethical. Another example of contemporary threats to China’s cavefishes is the harvest of a host of “Oil Fish” (*Sinocyclocheilus* spp.) that exhibit a bat-like ecology. As mentioned above, these species live underground during the day and exit the cave to feed in productive surface waters at night. Other species migrate annually into subterranean waters to seek shelter from seasonal changes on the surface. All of these movements are very predictable in both space and time, making fish easy targets for modern fish traps and nets. Unfortunately and predictably, a commercial fishery has developed for these species, considered a delicacy in many parts of China. Overfishing is rampant and there are numerous examples of populations that have nearly vanished completely under this harvest pressure. With commercial harvest, environmental contaminants, limestone quarries, and excessive groundwater extraction, these species face a challenging future. We’d like to make an appeal to everyone: please don’t contribute to the loss of these species by purchasing

them, for any purpose. Regardless of what has happened in the past, it is our generation that needs to step up, do the right thing, and put conservation of rare and fragile species first. So who are “we.” We are the Chinese Cavefish Working Group (CCWG), a group of concerned biologists. We conduct surveys in South China to document populations of cavefishes and other subterranean fauna and to better understand the threats that they face. In addition, we are conducting studies of biomechanics, genetics, systematics, and population ecology. One of the most rewarding aspects of this work has been the opportunity for foreign cave biologists to interact with Chinese graduate students and train them in caving and cave biology. We are hopeful that the next generation of Chinese cave biologists may benefit from our efforts. A primary goal of the CCWG is to provide critically important data to wildlife authorities in hopes that some of these amazing species can be saved. Many healthy populations of cavefishes remain and much can be done to ensure their future. The San Antonio Zoo has been a key sponsor of the group and has developed labs for work with captive populations of subterranean species. Conservation breeding programs may wind up being the last stop for a few of the groundwater fishes below rugged South China and long-term plans are in place to develop an institute for the conservation of subterranean species within China. National Geographic – China, has funded field work across the past several years (grant numbers GEFC-15-13 and GEFC-15-16).

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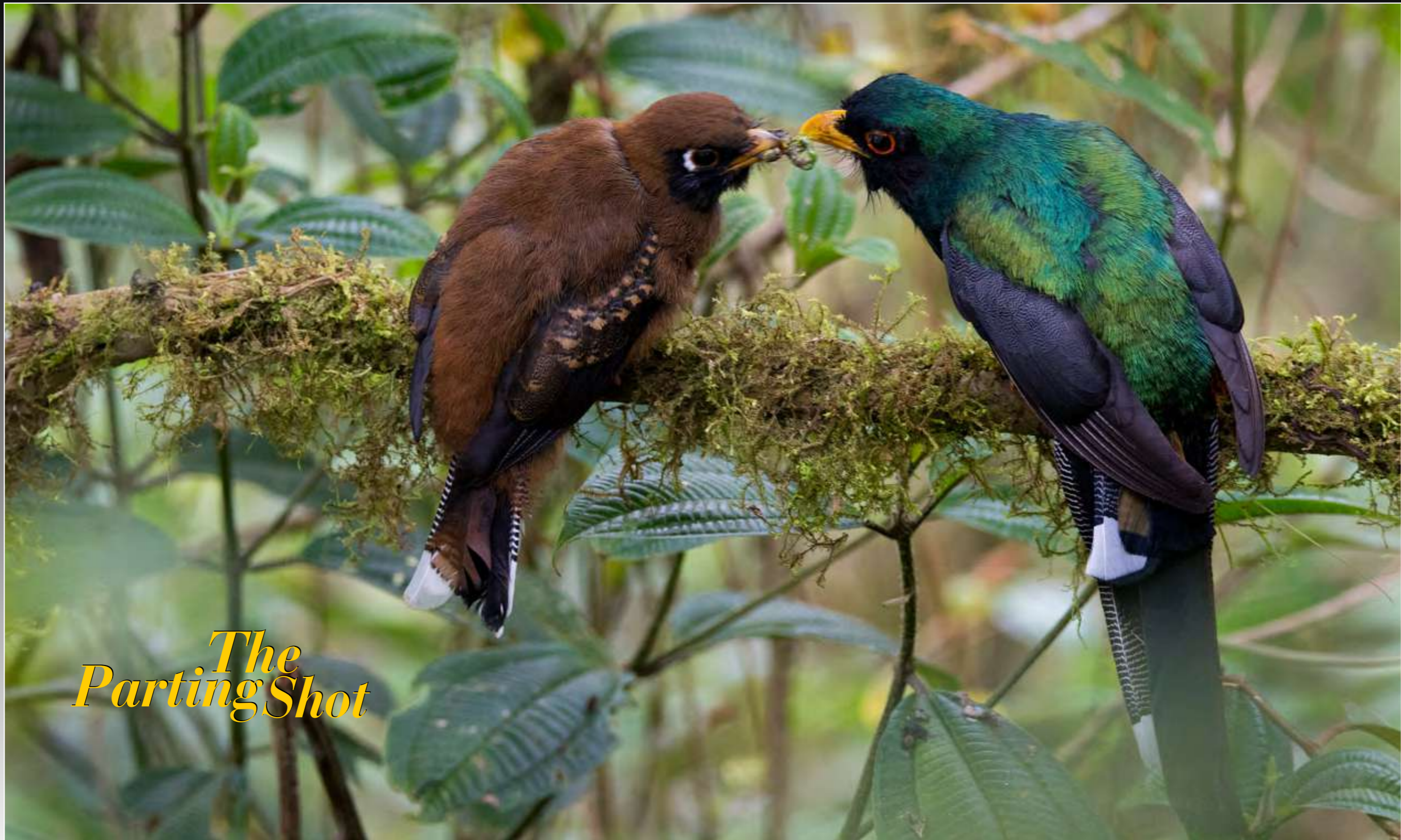
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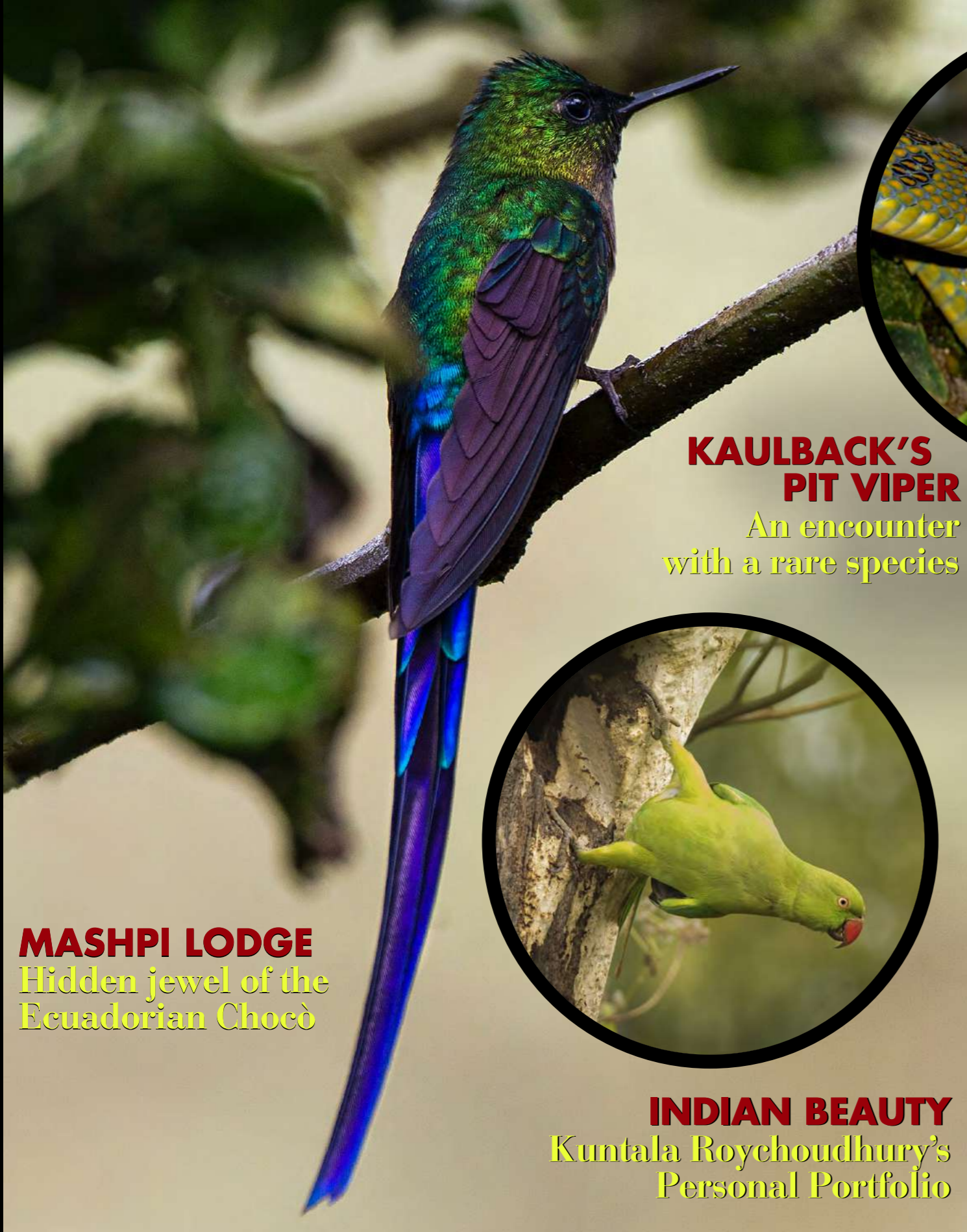


The Parting Shot

As we were exploring the montane cloud forest shrouding the steep hillsides around Mindo, Ecuador, together with our friend Lucas M. Bustamante of [Tropical Herping](#), we recently had the lucky opportunity to briefly glimpse an enchanting moment of natural history and wildlife behavior. These cool, thick woods and ravines are shrouded in hanging mosses and epiphytes, and heavily populated with a multitude of stunningly beautiful bird species - notably a great number of hummingbirds, toucans, toucanets and tro-

gons. The latter tend - as it is the habit of this beautiful genus - to perch quite still on horizontal branches at low and mid-height, softly clucking, chuckling and churring to themselves, their presence often being betrayed only by the slow, methodical, almost clockwork-looking turning from side to side of their head, by which they constantly survey their surroundings. It was quite surprising seeing a beautiful metallic green and blue male Masked trogon *Trogon personatus* - which we had been observing as it caught and ate a

variety of moths - suddenly flutter to a nearby branch and offer a freshly caught caterpillar to a nearly invisible brown female, which we had obviously not noticed as it perched quietly nearby. The offering and consequent acceptance and gulping down of the nuptial gift took place in a very short time - barely enough to focus in the low, mottled light of the dark forest understory and shoot a three-second burst: but it was enough to capture this unique, surprisingly tender and intimate act of courtship. ●



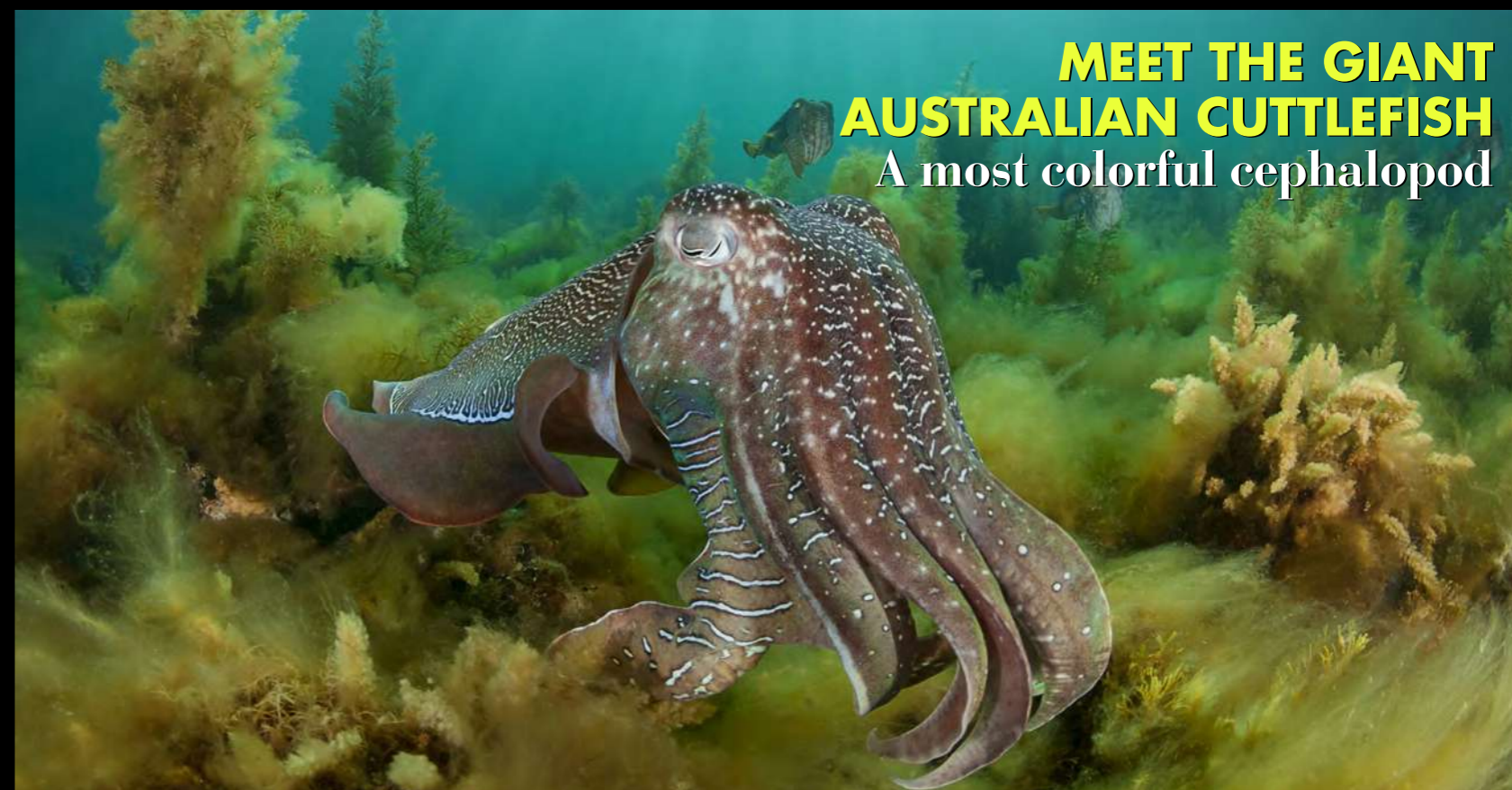
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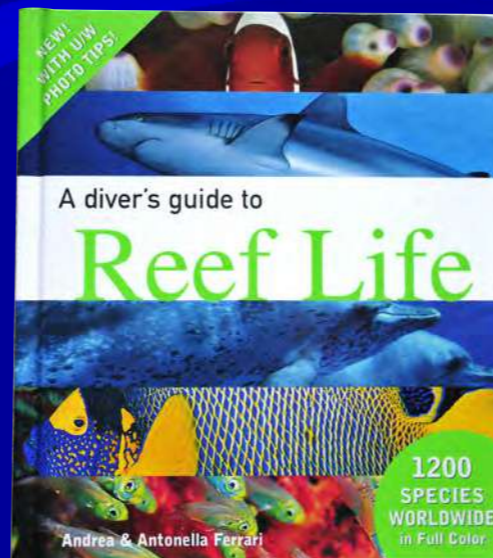
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AUSTRALIAN CUTTLEFISH**
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A Diver's Guide to the Art of Underwater Photography

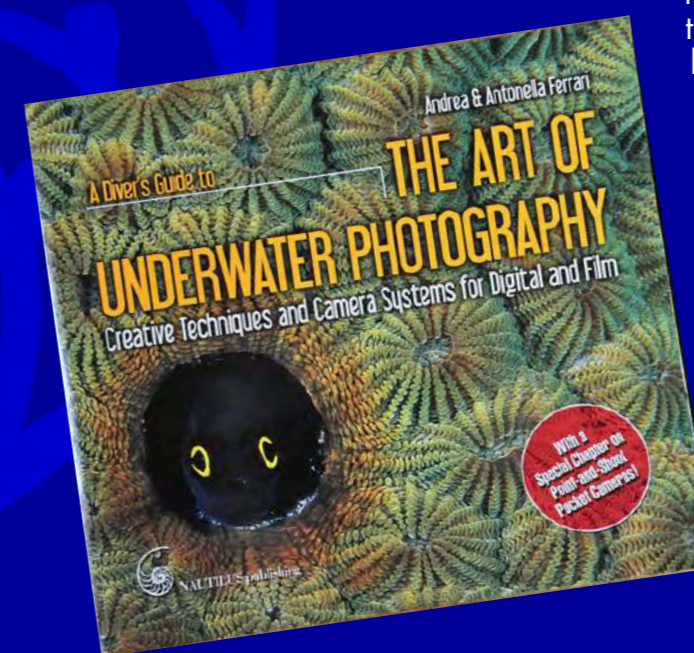
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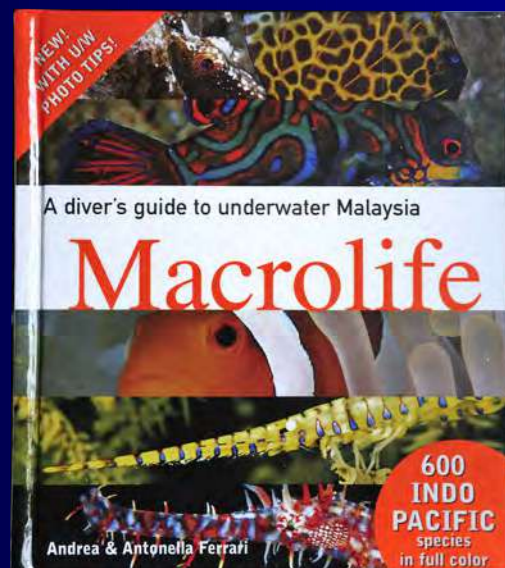
ALEX MUSTARD, WETPIXEL.COM: This book gives us a rare insight into the mindset, dedication and imagination involved in creating magnificent underwater images. I sat down and read this enjoyable book from cover to cover. The lack of techno-talk makes it a very accessible method to improve your photography. The images are some of the finest you will see in a guide to underwater photography. All the images are very well reproduced, which will not come as a surprise to anyone who owns any of the other books by the authors. A large format 360 page feast of fabulous images and thought provoking and enjoyable writing on taking pictures in the ocean. • UNDERCURRENT: This book is filled with spectacular images, designed not only to offer great technical guidance, but also help the underwater photographer discover and develop the artist within. Clearly the best and most beautiful "how-to" book ever produced. • JOHN BANTIN, DIVER MAGAZINE: With an enviable reputation for authoring fine books on underwater photography, the Ferraris have laced the pages of their new book with juicy pictures.

There is none of the pseudo-art talk that often ruins otherwise beautiful books of photographs. I read it from cover to cover, and it's a great read. The pictures do the talking, and need no talking-up. This 360-page volume doesn't have a weak page in it. • MIKE SEVERNS DIVING: This book is less about the technical aspects of the craft and more about the art and the "eye." This is a big, fat, beautiful, coffee-table-type book that includes 400 photographs illustrating techniques to achieve such effects as artistic lighting and framing. Inspirational as well as educational.



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A Diver's Guide to Underwater Malaysia Macrolife

600 INDO-PACIFIC MACRO marine species featuring 800 SPECTACULAR COLOR PHOTOS with full details on distribution, habitat, size, life habits and underwater photography tips

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DIVERNET: Not only does it help identify the critters, but it also gives useful tips on how to photograph them. • BACKSCATTER: Best work I've yet seen. For Mabul or Kunkungan, this book should be as necessary as a passport. • FAMA MAGAZINE: Well written, quite informative, beautifully illustrated... a priced right, quality publication. Get a copy, you'll be happy you did! • TAUCHEN MAGAZINE: 600 marine species illustrated with spectacular photos and a compact text for a very useful and much needed underwater guide. • ASIAN DIVER: Illustrated with more than 800

extraordinary colour photos, this is the field guide of choice for all serious macro divers. • NORTHERN CALIFORNIA UNDERWATER PHOTOGRAPHIC SOCIETY: The photography is impressive - if you need to identify any species from this area, this guide is a gem. • UNDERCURRENT: We just discovered the ultimate guide to Indo-Pacific macro life - this book is a must for traveling divers. BBC WILDLIFE MAGAZINE: Identifies and describes 600 small marine species from the Indo-Pacific. Clear, concise, informative... packed with more than 800 colour photos. • FOUR LAKES SCUBA CLUB: Both a macro and a fish field guide for all serious divers from the Maldives to Australia. A must! • DIVER MAGAZINE: Colour photographs of the highest quality make it easy to identify what you have seen...An essential tool for anyone.