Audubon

FALL 2016

The Hoot Listeners

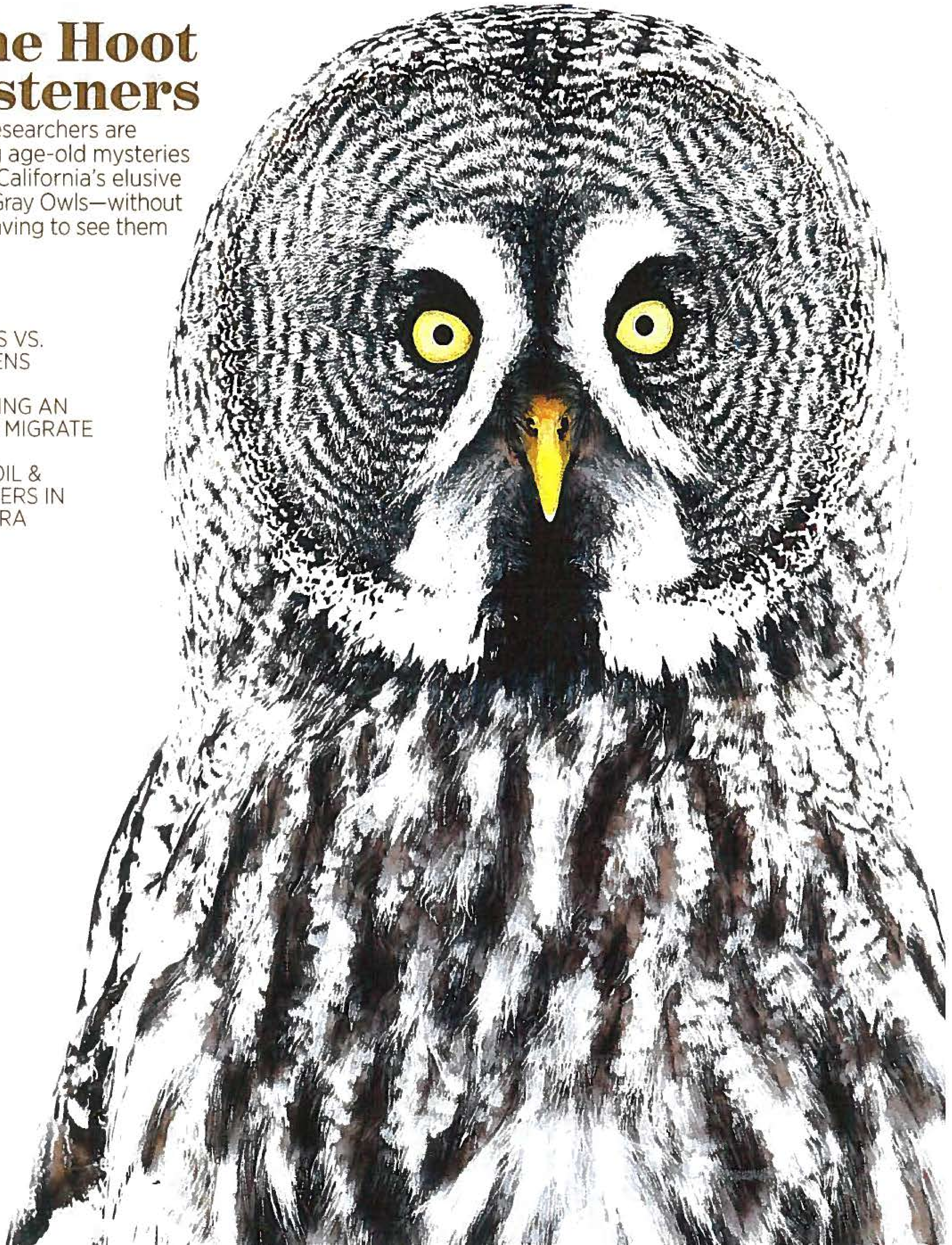
How researchers are solving age-old mysteries about California's elusive Great Gray Owls—without ever having to see them

Plus:

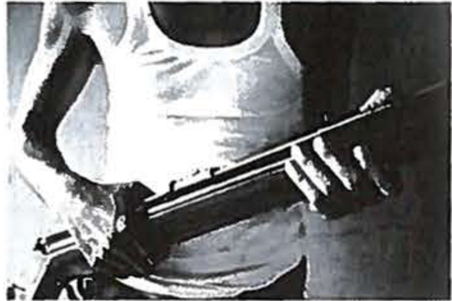
EAGLES VS. CHICKENS

TEACHING AN IBIS TO MIGRATE

PALM OIL & POACHERS IN SUMATRA



OIL BARRENS



As palm oil finds its way into an astonishing half of all grocery-store products, Indonesian rainforests are falling to make way for plantations, releasing vast quantities of CO_2 and giving poachers easy access to endangered Helmeted Hornbills.

BY JOCELYN C. ZUCKERMAN
Photography by Paul Hilton

THE ONE WITH THE GUN ARRIVED WITH A COCKY flourish, sauntering through the doorway in a white muscle tee and blue jeans torn at the knees. He settled in on the plastic flooring, lit up a thick clove cigarette, and began animatedly to talk about the 23 critically endangered birds he'd shot from the Indonesian sky in the previous five months. All cheekbones and shiny black hair, the handsome 37-year-old passed around his 4.5-millimeter weapon so we visitors could admire its sleek caramel stock and gleaming brass barrel. He was happy to be photographed and videotaped mimicking the high-pitched-honk-transitioning-to-maniacal-laughter of his feathered victims. *"Koo! Koo! Koo! Koo! Koo! Koo! Koo! Koo! Koo-koo-koo-koo-koo-kah-kah-kah-kah-kah-kah-kah-kah-kah-kah kah!!!"*

As recently as a year ago, neither this guy nor either of his pals could have picked out a Helmeted Hornbill from a children's picture book. Now the three go on about how the bird they call *Rangkong* travels in pairs and favors the high branches of a particular fig tree across the river. The birds come out in the morning, they say—around 7 or 8—and again in late afternoon. When a male is

Produced in collaboration with the Food & Environment Reporting Network, a nonprofit news organization.

SMOKE SIGNAL
A palm oil mill in operation at a plantation in northern Sumatra. Global production of the oil has doubled in the past decade and is set to do so again by 2020. Above: A poacher poses with his rifle.

killed, his mate will appear "a bit lost," flying around in search of him and calling out to her friends.

I'd been led to this modest brick home in Aceh province, on the northern tip of Sumatra, by a local environmental activist named Rudi Putra. A 39-year-old with a faint goatee and a degree in conservation biology, Putra developed an early love for his native island's iconic rhinoceros and now devotes his life to protecting it and the region's other wildlife. It's a calling that often involves run-ins with poachers like these. The men kill the Helmeted Hornbill for its unique casque, a solid-keratin enlargement on the upper part of the bill. Long prized by the Chinese when sculpted into snuff bottles and jewelry and ground into traditional medicines, the item has taken on new status in recent years, thanks in part to the growing difficulty of procuring elephant tusk. Putra understands the economic desperation that leads these men to shoot birds; rather than vilify them, he aims to steer them toward alternatives.

But poachers' guns are just the latest threat to the archipelago that Putra calls home. Indonesia is ground zero for palm oil, a substance that, unbeknownst to most Americans, has quietly invaded our lives. Now present in half of all products on U.S. grocery store shelves—from crackers and ice creams to lotions and lipsticks—the cheap, versatile commodity also is on a precipitous rise in India, China, and beyond. Globally, production of palm oil has doubled during the past decade, and is set to do so again by 2020.

Cultivation of the oil palm plant already has exacted a devastating toll on the birds of Indonesia (and of Malaysia, where most of the rest of the world's oil palm is grown). Here on Sumatra, more than 75 percent of the 102 lowland-forest-dependent bird species are now considered globally threatened. And BirdLife International reports that 27 of the island's 34 Important Bird Areas contain major tracts of just the sort of lowland forest prized by the industry.

Home to 382 bird, 105 mammal, and 95 reptile and amphibian species, the butterfly-shaped Leuser is a UNESCO World Heritage site and ranks among the most biologically diverse places on Earth.

As the forests disappear, hornbills and other birds find themselves squeezed into ever tinier patches of suitable habitat. At the same time, new roads and oil-palm plantations render the remaining forests that much more accessible to poachers. Yokyok "Yoki" Hadiprakarsa, a conservation biologist who directs the Java-based Indonesia Hornbill Conservation Society, estimates that between 2012 and 2015, more than 2,400 Helmeted Hornbills were killed in the country. Having decimated populations in Kalimantan (the Indonesian part of Borneo) and southern Sumatra, the poachers have now shifted their efforts north. This past June, authorities here confiscated 12 casques, two rifles, a digital scale, and disposable cellphones from a pair of Acehnese men who confessed to selling at least 124 beaks to Chinese middlemen in the previous six months. In only three years, from 2012 to 2015, the Switzerland-based International Union for Conservation of Nature downgraded the Helmeted Hornbill two full classes—from "near threatened" to "critically endangered."

Thanks largely to the palm oil industry, Indonesians who for centuries have lived off of the land, sourcing their food, building materials, firewood, and water from the forests, now find themselves having to pay for such necessities. "People fight on a day-to-day basis to fulfill their daily needs," explained Hadiprakarsa, "so they look for quick opportunities. For those living near the forest, hunting for wildlife is the obvious option."

But the destruction of Indonesia's tropical rainforests has implications for us all. Not only do the archipelago's forests provide one of the planet's most significant carbon sinks, but the country is home to Earth's

CLEAR CUT
Newly cleared land in the Leuser Ecosystem attests to the weak enforcement of laws intended to protect this vital habitat. Indonesian populations of Rhinoceros Hornbill (opposite) have dropped to fewer than 3,000. Though its casque is hollow, poachers mistake it for the more valuable (solid-casqued) Helmeted Hornbill.

largest concentration of tropical peatlands—soils formed over thousands of years through the accumulation of organic matter. The peat deposits on Sumatra alone, which stretch across 460,000 acres and can reach depths of 25 feet, contain 11 times more carbon than the biomass of the forests above them. When the palm oil companies burn the peatlands as a precursor to digging canals and planting, massive quantities of carbon dioxide escape into the atmosphere. Deforestation and peat degradation account for a full 85 percent of Indonesia's CO_2 emissions; today the nation ranks fifth in the world in greenhouse gas emissions.

A VIOLENT 30-YEAR SEPARATIST INSURGENCY long spared Aceh province the fate of the rest of Sumatra, until the signing of a 2005 peace accord put an end to that. In particular, the palm oil industry has its sights set on the province's Leuser Ecosystem, a 6.5-million-acre expanse of lowland and mountainous rainforest that spreads across the bottom half of the province. Home to 382 bird, 105 mammal, and 95 reptile and amphibian species, the butterfly-shaped Leuser is a UNESCO-designated World Heritage site and ranks among the most biologically diverse places on Earth; the poachers live at its heart in a hamlet called Tamieng. The Leuser, one-third of which comprises Gunung Leuser National Park, is the last remaining area of sufficient size and quality to support viable populations of Sumatran tigers, elephants, and rhinos, and of orangutans, clouded leopards, and sun bears. In addition to its Helmeted, Rhinoceros, and other Hornbill populations, it is alive with the calls of the Tan-breasted Partridge, the Salvadori's Pheasant, various laughingthrush, and the critically endangered Rück's Blue-flycatcher.

Considered a National Strategic Area for what the government terms its "environmental-protection function," the Leuser is safeguarded under Indonesian law. Still, the past 15 years have seen roughly 15 percent of its area lost to palm oil plantations and extractive industries such as timber and mining. (Activists and NGOs in the region say that companies secure permits through backroom deals with local officials or simply clear the land illegally. A lack of oversight on the national level means they mostly do it with impunity.) In addition to diminishing overall hornbill habitat, the incursions impact the particular requirements of the birds. Known as the "farmers of the forest" for the critical role they play in dispersing seeds, hornbills need dense habitat and a steady supply of fruit. Their unique nesting habits depend on the sort of old-growth trees that tend to fall first to developers. A female ready to lay her eggs retreats to a natural cavity inside a wide trunk. She and her partner seal the entrance with a paste of fruit, mud, and feces, leaving a small slit through which he will feed her (and eventually her chick) for up to five months. Killing a male hornbill, then, as poachers are wont to do given the gender's larger size, often means the demise of female and chick as well.

Putra and his colleagues routinely face off against locals and company officials, one of whom sued him unsuccessfully for damaging property. "All these people are always getting mad at me," he said with a shrug.

BITTER HARVEST
A worker gathers oil-palm fruit in Sumatra, where the spread of such plantations has helped cause more than 75 percent of the 102 lowland-forest-dependent bird species to be considered globally threatened.

Putra's beloved rhinos—along with northern Sumatra's tigers and elephants—also are falling prey to the palm oil industry. Deprived of native habitat, the once-sheltered animals have begun encroaching on local communities. Farmers and plantation workers, annoyed by the beasts' habit of knocking down homes and trampling crops, respond by setting out poisons and traps. Sumatran rhinos, once widespread across Southeast Asia, now number an unimaginable 100 individuals. So embattled are the region's orangutans that rescuers armed with tranquilizer guns and nets have taken to patrolling in the hopes of spotting primates marooned amid the growing sea of palm. The disoriented animals get trucked off to forests capacious enough to accommodate them, while the orphaned and wounded among them are relocated to a now overcrowded rehabilitation center outside the nearby city of Medan.

Hornbill poaching is a recent development. It was just at the end of 2014, explained the oldest of the three poachers, the one who invited us into his home and served us syrupy coffee, that he and the others began noticing strangers in their midst, men from Jambi province, south of this remote village, and Chinese fellows who'd swoop in for a day or two before disappearing again. Eventually it became clear that the outsiders had come in search of Helmeted Hornbills, one of 10 hornbill species that make this island their home. (Among about 60 hornbill species worldwide, roughly half are native to South Asia, including 13 that call Indonesia home. The other hornbills, none of which is seriously threatened, are endemic to Sub-Saharan Africa.) At $6,000 a kilogram, the birds' casques, commonly referred to as "golden ivory," "red ivory," or "golden jade," sell for five times as much as elephant ivory. Hong Kong shops display intricately carved trinkets made from the body part with price tags in the tens of thousands of dollars. Who could blame the guys for wanting a little piece of the action?

PUTRA TRACES HIS OWN AWAKENING TO THE importance of a preserved Leuser Ecosystem back to 2001. While he was working as a researcher there, a violent flood so ravaged his and other downstream communities that he determined to fight deforestation at any cost. When support for his government-funded job dried up, Putra took to arranging meetings with community members, cops, local officials, and civil society groups in an effort to thwart the palm oil industry, which by 2000 had supplanted logging as the number one threat to the Leuser. Putra began leading teams of volunteers into the forest to confront poachers and dismantle their snares. He eventually founded the Leuser Conservation Forum, which, with the help of such donors as the Leonardo DiCaprio Foundation, today employs more than 70 rangers to keep watch over the region, protecting it from poachers and illegal palm plantations alike. In 2014, Putra received the Goldman Environmental Prize, a $175,000 honor given annually to a handful of grassroots activists working across the globe.

Slim bordering on concave, with an ascetic fashion sense that runs to rubber flip-flops and worn T-shirts, the soft-spoken father of two is an odd mix of high-functioning executive, self-contained prophet, and guileless child. Wielding a flat Samsung in one hand and a skinny Nokia in the other, he juggles calls from multiple continents but dissolves into giggles when recalling his initial face-to-face encounter with a rhinoceros. ("The first time we met with a rhino, our team just run! And the rhino run the other way!") At a meeting in an open-air bungalow set high up on stilts, Putra sat cross-legged before 26 employees dressed in "Wildlife Protection Team" T-shirts and spoke with a quiet authority about the group's often dangerous work. "Remember that the people who go into the forest to poach are our friends and family," he counseled the group, who ranged in age from 25 to 70. "We shouldn't hate them. We should be gentle with them and explain why they shouldn't poach."

By 2009, Putra, who still accompanies his rangers on 15-day patrols each month, had begun taking chainsaws to northern Sumatra's illegal palm plantings. (Provincial officials issue preliminary "scoping" permits under which companies are expected to secure the consent of local communities and prepare environmental assessments as steps toward eventual permission for development. Many forge ahead with clearing and planting without following through on either.) We spent one cloudy afternoon traipsing over hills and weaving among gigantic palm fronds to reach a stand of trees in a 2,600-acre plot on the eastern fringe of the Leuser. Trailed by a handful of curious kids and accompanied by 11 local guys toting banana, durian, and other seedlings—they sow native crops on the sites of downed oil palms—we looked out across a terraced landscape of muddy green, the only variation in hue the pale moons of already felled trunks. One of the guys revved the chainsaw motor and then drove its five-foot blade relentlessly through the base of a fat trunk. The behemoth crashed to the ground with a thud. Though we encountered no resistance on that particular day, Putra, who at this point has dismantled 26 illegal plantations—some 7,500 acres of oil palm—said that confrontations are a part of the job. The support of local cops helps, but Putra and his colleagues routinely face off against locals and company officials, one of whom sued him for damaging property. (The plantation in question was deemed illegal and its owner ultimately forced off the land.) "All these people are always getting mad at me," he said with a shrug.

PALM PIRATE
Rudi Putra, who accompanies his rangers on 15-day monthly patrols, has dismantled 26 illegal plantations—roughly 7,500 acres of oil palm.

As the forests disappear, hornbills and other birds find themselves squeezed into ever tinier patches of suitable habitat. At the same time, new roads and plantations render the remaining forests that much more accessible to poachers.

Back outside the plantation boundaries, I stopped to chat with a local named Ngatimen. In the late 1990s, he told me, he and fellow villagers planted oil palm in a previously logged section of forest. (Small-

holders, who sell to local mills for eventual absorption into the larger supply chain, account for some 40 percent of Indonesia's palm oil output.) "We didn't do a cost-benefit analysis," he said. "We thought we'd sell the fruit easily." When in 2012 global palm oil prices tumbled, the villagers found themselves struggling to feed their kids. They've since destroyed the palm trees and replaced them with lemon, orange, and hardwood. But the community, whose residents are among the 4.5 million Sumatrans dependent on the Leuser for water and food, continues to suffer the ill impacts of the industry. Flash floods have become more frequent thanks to erosion, and incursions by unwanted wildlife have become commonplace. While the palm oil companies do bring a moderate number of jobs when they enter a community, the work tends to be low-paying, with little opportunity for advancement. (Palm oil workers in Kalimantan have confessed to poaching the anteater-like—and endangered—pangolin at night in order to supplement their meager day-job wages.) Before the palm oil companies moved in, Ngatimen said, "there used to be all sorts of birds. Now you have to travel very far into the mountains to hear anything."

PUTRA WAS DETERMINED THAT I SPEND SOME time in a part of the Leuser known as Ketambe ("the most beautiful place in the world," he'd said by email), where a 30-year-old research station plays host to scientists studying the area's rich biodiversity. While much of the surrounding region was logged four decades ago, the remote heart of Ketambe remains blessedly untouched. After a 40-minute flight south from the provincial capital of Banda Aceh (site of the devastating 2004 tsunami), waves of green Leuser rippling out to the horizon, we touched down in a valley cradling a scattering of villages. Wending around twisty roads, we passed mats of brown candlenuts drying in the sun and clutches of little girls marching off to school in long-sleeved shirts and matching headscarves—evidence of the strong Muslim tradition alive here on the tip of the island.

A dugout canoe spirited us across a rushing river, depositing us in the sand, and we made our way into the near-dark of the forest. Stepping over fallen logs and leaves in various stages of decay, we navigated through a thicket of trunks with diameters ranging from an eighth of an inch to six feet. A century-old strangling fig, its individual roots intermingling into an eventual whole, reached heroically for the sun. At one point we spotted an orangutan—a 15-year-old female named Kelly, we were told—chilling some 70 feet above us. After staring us down for a good 10 minutes, she reached out a fuzzy orange arm, the skinny trunk supporting her bending cartoon-like under her weight, and swung to grasp an adjacent branch. Buzz of cicada, trickle of water over stones. Trill. Chirp. Squawk. The place was a riot of life, black marble centipedes here, saffron butterflies there. (And leeches all over us.)

A huge, gray pheasant with a long tail and little blue head—a Great Argus—clambered through the underbrush, followed later by a tiny, gray-stomached Horsfield's Babbler. From far above came the loud whistle of the Asian Fairy-Bluebird and the rapid *tu-trruk, ku-trruk* of the diminutive Black-eared Barbet.

TRAPPED
A young orphaned orangutan clings to its cage at a wildlife trader's property in the Leuser. A poacher can collect $250 for an orangutan of this size.

At $6,000 a kilogram, the birds' casques, commonly referred to as "golden ivory," "red ivory," or "golden jade," sell for five times as much as elephant ivory.

A Cream-vented Bulbul flaunted its fabulous green-yellow wings. But it was a rhythmic, helicopter-like whooshing that stopped us in our tracks. Raising our eyes to the canopy, we caught a pair of Wreathed Hornbills flap in and out of sight. At another point, two Wrinkled Hornbills put on a show, one feeding figs to the other, the duo flying off in quick succession. With black bodies and frilled white skirts, they evoked cocktail waitresses in the sky. The elusive Helmeted Hornbill failed to materialize—not surprisingly, given its diminished numbers—as did its casqued cousin, the Rhinoceros. Though the latter's "ivory" is hollow, the bird also has fallen victim to the poachers, many of whom mistake it for their Helmeted prey; Indonesian populations of Rhinoceros Hornbill are estimated to have dropped to fewer than 3,000.

BACK ON THE OUTSKIRTS OF THE LEUSER, Putra and I set out one morning to investigate some smoke he'd noticed the day before, which he suspected was rising from within the national park. After an hour of switching back over tawny dirt roads and, as seems inevitable, getting lost amid the maze that is an oil palm plantation (the smoke rose from its far side), Putra punched some numbers into his Nokia and a man named Pranyoga soon materialized on a red motorbike. "He is the best of my spies," Putra said. "I call him 'the man without afraid.'" Pranyoga, who grew up nearby in a forest that's since been supplanted by palm, has worked with Putra for 16 years, serving as a liaison to the community and keeping a watchful eye on the comings and goings, often illegal, of the industry. Though he has had repeated threats to his life, he says he's determined to ensure that his own kids get the chance to appreciate the elephants, sun bears, orangutans, hornbills, and magpies he remembers from his own childhood.

Our driver followed Pranyoga's bike up, down, and around endless curves until we eventually reached a ridge and found ourselves looking out over a vista painted entirely in black. Trudging through the still-smoldering ash, Putra estimated that the blaze had been set a week earlier—some 150 acres of secondary lowland forest torched. The culprits, he imagined, were land-starved locals looking to cultivate rubber and cacao—maybe even some oil palm—as an income source. We picked our way around charred stumps and over the mottled beige and cinnamon corpse of a Burmese python. Crunching over brittle twigs and roasted ferns, we noted the weird dissonance of the pleasant, Indian sandalwood-scented air. "The government says it doesn't have the budget," Putra said. "But we can prevent this if they cared about it." (Despite numerous requests, Siti Nurbaya, Indonesia's Minister for the Environment and Forests, declined to comment for this story.)

Eventually the dry tree leaves rasped and the air began to fill with smoke. "Jocelyn, look!" Putra called, pointing to a mass of orange growing in the distance. The wild, hungry flames ripped steadily toward us, cracking and popping as ashes began floating down like ebony snowflakes. With smoke filling our lungs and stinging our eyes, we hurried back to the car and, streaked with black, raced away from the heat. On the way out, we passed yet more industrial plantings, right inside the national park. "I hope this fire will reach the palms," Putra remarked to no one in particular.

AS THE WORLD NOW KNOWS, FIRES IN Sumatra are no rare occurrence. In 2015, blazes traced to palm oil plantations on the island and in neighboring Borneo destroyed more than six million acres of forest, blanketing a swath of Southeast Asia from Jakarta to Bangkok in haze for weeks and sickening hundreds of thousands across Indonesia, Malaysia, and Singapore. The World Bank put economic losses from the fires at $16 billion. (Not quantified were the nine orangutans that burned to death and the more than 100 others found trapped or wandering near villages.) The unique composition of the soil renders the fires nearly impossible to extinguish—they can smolder and emit carbon for decades. Scientists have said that in order to limit warming to 2°C, the world can emit no more than 600 billion tons of greenhouse gases between now and 2050. Indonesia's peatland carbon alone, if released as CO_2 in the atmosphere, equals one-third of that remaining budget.

If nothing else, the impossible-to-deny conflagrations have shamed the Indonesian government. In April, a few days before nations from around the world convened to sign the Paris Climate Agreement, President Joko Widodo announced a countrywide moratorium on new palm oil permits. Indonesia "mustn't allow our tropical rainforest to disappear because of monoculture plantations like oil palm," he'd stated some months earlier. With better seeds and increased productivity, he said, the country ought to be able to maintain its palm oil industry without continued widespread clearing.

Putra is hopeful that public pressure may also help save the imperiled Leuser. In April, the activist accompanied Leonardo DiCaprio on a visit to the region, and the actor responded by exhorting his then 15.8 million Twitter followers to sign a petition demanding that President Widodo cancel a proposed "spatial plan" that would fail to protect the Leuser from development by the palm oil and other industries. Government officials accused DiCaprio of running a "black campaign" aimed at discrediting the palm oil industry and threatened to run him out of the country. Two weeks later,

Before the palm oil companies moved in, Ngatimen said, "there used to be all sorts of birds. Now you have to travel very far into the mountains to hear anything."

however, Environmental Minister Nurbaya declared a commitment to enforce the national moratorium in the Leuser and said the government would review any existing permits related to the reserve.

"There's no guarantee on the outcome," said Gemma Tillack, agribusiness campaign director for the San Francisco–based Rainforest Action Network, which works to preserve the Leuser, "since there's no transparency around how the moratorium will be conducted." Her organization intends to fight for a revised plan as well as for the establishment of a management authority tasked exclusively with protecting the Leuser. Putra, for his part, is determined not only to get the plan canceled and all illegal permits revoked, but also to get 250,000 acres of the reserve replanted with native flora.

Meanwhile, the Acehnese locals will continue to get by doing whatever it takes. The three poachers I met in Tamiang, all of them "ex-combatants"—veterans of the independence movement and, like most of their former comrades-in-arms, unschooled and ill-prepared for formal employment—are likely planning their next three-week foray into the forest in search of the prized Helmeted Hornbill. They don't particularly understand the Chinese buyers' obsession with the birds—they've heard they use the casques for jewelry or as toys for their kids—but they know there's a ready market. "The moment you come down from the mountain," our host explained, "immediately someone will come and take the casques to Medan." The sale of a single beak, he added, will mint enough to feed three families for a month. "Whatever reason they might want them," chimed in the gun owner, "we will sell them. If there was an easier job, especially if it wasn't illegal, of course we would choose that."

In fact, he had shelled out extra money to have his rifle customized to shoot 5.5-millimeter pellets. The standard 4.5 ones, he said, tend not to kill the hornbills on impact, and he and his buddies can't stand to watch the birds suffer. Ⓐ

The former deputy editor of Gourmet *and executive editor of* Modern Farmer, **Jocelyn C. Zuckerman** *is working on a book about palm oil.*

In Search of Virtuous Palm-Oil Products

Though it's nearly impossible to avoid palm oil in your daily life, you can help ensure the products you buy don't contribute to climate change and hasten the demise of the Helmeted Hornbill. The Rainforest Action Network (ran.org) tracks the industry closely, and publishes annual progress reports on "the Snack Food 20"—companies that control some of the world's best-known sweets and chips brands—and their commitments to using conflict-free palm oil. (In addition to driving deforestation, the industry has been implicated in widespread land-grabbing and labor abuses.) Earning high marks in the 2015 report were Mars, Smucker's, General Mills, Kellogg's, Nestlé, Dunkin' Brands, Hershey's, and Krispy Kreme. Laggards included Campbell's, Tyson Foods, ramen makers Nissin Foods and Toyo Suisan Kaisha, PepsiCo (Doritos), and the KraftHeinz Company. Similarly, Greenpeace (greenpeace.org/usa) publishes a Palm Scorecard, tracking food and personal-care brands on progress in improving their supply chains. Leaders in the latter category include Unilever, while Colgate-Palmolive lags. Both groups also spearhead social-action campaigns aimed at holding businesses and governments accountable; follow them on Facebook and Twitter to join the latest petitions and campaigns. —J.C.Z.