



CONSERVATION BIOLOGY

The Fight for Yasuni

A group of scientists is on the verge of winning its battle to protect an Ecuadorian forest containing record biodiversity—but will the world pay to seal the innovative deal?

In 1997, 25 years after the first of many childhood canoe trips with his father down Ecuador's lower Napo River to the Limoncocha Biological Reserve, David Romo returned to find the site trashed beyond recognition. Once a pristine habitat fiercely defended by indigenous hunter-gatherers known as Waorani, the reserve had been overrun by a settlement of farmers who had moved in after construction of an oil-access road. The Waorani were gone, and so were many of the species that had made up the reserve's acclaimed biodiversity. Nowhere were once-common birds such as the grey-winged trumpeters and harpy eagles. The colonists had decimated the lake's fish and caiman populations, and poaching and tree-cutting felled the last primary forest in the area. "The forest was completely destroyed," Romo, a conservation biologist at Ecuador's San Francisco University of Quito, recounts with dismay.

Not long after Romo's unhappy return, the lure of oil threatened to bring similar devastation farther south to Ecuador's Yasuni National Park and the adjoining Waorani Ethnic Reserve. In 1989, this 17,000-kilometer section of the Amazon Basin had been designated a UNESCO Biosphere Reserve. But it also happens to sit atop Ecuador's second largest reserve of crude oil, a block of concessions collectively known as the Ishpingo Tambococha Tiputini (ITT) field. In 2003, that rich prize spurred plans to build a new oil-access road into the park, instilling fears

of a repeat of what happened in Limoncocha. "I realized then that we needed to bolster our conservation efforts with good, credible science if we were to have any chance of saving Yasuni," says Romo.

Over the past decade, he and more than 50 other biologists working in the area have documented Yasuni's remarkable biodiversity, providing evidence that its forest has the highest number of species on the planet, including an unprecedented core where there are overlapping world richness records for amphibians, reptiles, bats, and trees. And after helping to form a group called Scientists Concerned for Yasuni, Romo and his colleagues have waged an international campaign to protect the location.

This unabashed science-based advocacy has had an impact. In 2005, the year after the group published a preliminary analysis of Yasuni's biodiversity and recommended its protection, Ecuador's government rejected further road-building inside the park. Two years later, Ecuador President Rafael Correa went even further, offering a proposal in which his country would, in exchange for several billion dollars, keep the ITT oil permanently underground in order to protect the park and to fight global warming. Industrialized countries would essentially pay to keep the park's oil-

derived carbon in the ground.

After several years of political negotiations and drama, the innovative initiative took a significant step toward reality this summer when the United Nations agreed to oversee a trust fund paid to Ecuador for the project. If all goes according to plan, the initiative may serve as a model for preserving intact biodiversity in other oil-rich portions of the western Amazon. But that's a big "if": President Correa has vowed to allow drilling if the international community fails to compensate Ecuador sufficiently.

Finding "megadiversity"

The magnitude of Yasuni's species richness first became evident in 1992 when the Maxus oil company hired botanists to salvage plant specimens during construction of a new road entering the northwest section of the park, which borders Colombia and Peru. It was a thrilling and yet exceedingly difficult task, recalls Nigel Pitman, a tropical biologist at Duke University in Durham, North Carolina, who in 1999 completed an inventory of 1500 different species of trees. "Getting familiar with the trees can take years," says Pitman, "and even then it means making up your own names for the dozens of species that are new to science. . . . It isn't even diversity any longer—it's hyperdiversity, or megadiversity."

But if field inventories were beginning to reveal the forest's extreme diversity, no one in

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View a slide-show of Yasuni's diverse species.

Protected park. Beneath this forest canopy lies a record-setting number of species.

the 1990s was synthesizing the voluminous, unwieldy mass of independently conducted plot-based studies into an overall picture of Yasuni's biodiversity. "People came to this area to do their research and left," says Holger Kreft of the Georg-August University of Göttingen in Germany, who has found that among lowland forests, Yasuni holds the record for most species of epiphytes: plants that grow on plants. "There wasn't anything approaching a network of scientists."

That changed after 2003 when the Brazilian national oil company Petrobras announced plans for a new 54-kilometer road into an isolated section of the park that would give access to the ITT oil fields. It was already clear that the Maxus road had provided an entry point for people to colonize the forest and for illegal logging in the park's northwest section, says ecologist Matt Finer, whose Yasuni postdoctoral research quickly shifted to campaigning once he discovered little if any organized opposition to Petrobras's new plans.

To conservation biologist Margot Bass, the announcement by Petrobras, one of the largest companies in the world, seemed like an irrevocable death sentence for Yasuni park. "I despaired," says Bass, an executive director of Finding Species, a small environmental group, who had worked in the park in the late 1990s.

Nevertheless, she and Finer, now with the Washington, D.C.-based environmental group Save America's Forests, rallied together a who's who of leading tropical ecologists, organizing a 2-day conference in October 2004 at which attendees detailed the biodiversity significance of Yasuni and illustrated how the previous Maxus road had spurred deforestation. The researchers followed up with intense lobbying. "This was not pure science," says Luis Suarez, head of Conservation International's Ecuador office, who was not part of the group. "They decided to take a position and produce not only a scientific paper but also write letters, give presentations, and basically put Yasuni on the agenda."

Despite scientific and legal challenges, Petrobras began road construction and was on the verge of entering the park when, at the end of April 2005, President Lucio Gutierrez was deposed after massive protests of his plans to revamp Ecuador's Supreme Court. By July, the new government had revoked the oil company's permit for the road. Soon thereafter, President Correa stepped forward with his ITT proposal. "We kept so much heat on the issue that it gave bigger and better

funded organizations time to try and put together a really systematic plan for the region," says Bass.

A Copenhagen setback

In the 3 years since Correa floated the Yasuni trust fund plan, oil exploration has progressed nearby—in eastern Ecuador and across the border in southwest Colombia and northern Peru—and scientists working at Tiputini Biodiversity Station, one of two university-affiliated research stations in the park, say it's as if an unstoppable force is closing in. "Tiputini is still very remote," says Christian Voigt, an animal behavioral physiologist, "but you can hear the generator of an oil platform from a few kilometers' distance, and at night you can see the glow of the gas flame."

Yasuni's advocates have pressed on with amassing proof of its biodiversity riches, hoping such data will persuade the international



Make a deal. If paid billions of dollars, Ecuador will prevent oil exploration in Yasuni.

community to pay for the park's protection. In January, Bass, Finer, Kreft, Pitman, and their colleagues published a data-rich, collaborative analysis in *PLoS ONE* that confirmed the existence within Yasuni of a so-called quadruple richness center. This 28,000-km² plot encompasses peak species records for amphibians, birds, mammals, and tree communities. "Yasuni is probably unmatched by any other park in the world in total number of species. Both our species-distribution maps and our comprehensive analysis of existing field inventories support this finding," says Bass.

The area around the Tiputini station, for example, has smashed the world record for local amphibian diversity, with its 139 species far exceeding the 98 documented in Leticia, Colombia, the previous record-holder. And for insects, Yasuni's estimated 100,000 species per hectare represents the highest biodiversity, per unit area, in the world for any taxonomic group.

Those who have made Yasuni their research home, and their mission, expected that Correa's initiative would get off the ground at the Copenhagen climate summit last December. But the Ecuadorian government questioned whether it had enough authority over the trust fund, and no deal was struck then, infuriating the country's environmental and scientific communities. "There was, already, Germany committing \$50 million per year for 10 years," an angry Romo recalled this spring, hands waving in the air. "We had letters of intent from at least five other countries—and now you say you want to go to OPEC and ask them for the money. That's betrayal!"

Emotions have cooled since then, and in August Ecuador signed an agreement enacting the governance arrangements on a deal to keep Yasuni oil fields untapped in exchange for a minimum \$3.6 billion in payments (about half the value of the oil if sold) from industrialized countries over the next 13 years. The United Nations Development Programme, which will oversee the trust fund, has suggested that the agreement could serve as a model for protecting ecosystems around the world.

However, numerous questions about the effort remain, particularly in regards to the composition of the government-dominated board tasked with dispensing the trust fund's monies for conservation and reforestation projects, sustainable energy development, and livelihood-training programs for the local indigenous communities. There are fears, for example, that indigenous representatives will be excluded from the decision-making process.

The biggest uncertainty remains funding. Chile has already committed \$100,000, and Ecuador's vice president had said that Belgium, Spain, Turkey, and China have also offered money. But no official pledges from those countries have been announced, and in September, Germany signaled it was rethinking its vital commitment of nearly one-sixth of the needed total. If \$100 million isn't paid into the United Nations fund by December 2011, Ecuador can refund any contributions—and analysts say Correa will then surely move to develop Yasuni's oil fields.

Although he's nervous about whether the international community will fill the trust fund, Romo says he believes that the Yasuni researchers have so far succeeded in a way that cannot be ignored, providing justification for the region's continued conservation. "What caught the world's attention is the science," says Romo. "But the clock is running and we cannot get distracted." —ERIC MARX
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