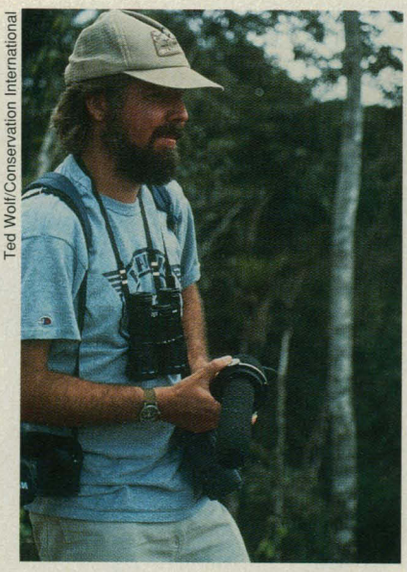
Ranking the Rain Forests

In a maverick new program, four tropical biologists are doing quick and dirty surveys of the world's rain forests to help decide which to protect—before they disappear

Ted Parker/Conservation International



Ted Wolf/Conservation International

Cloud forest. *Alto Madidi in the Andean foothills of northern Bolivia is one of the most diverse forests ever studied* (top). *RAP team leader Ted Parker* (left) *can identify 3000 bird species by song alone.*

FEARING THAT TRADITIONAL RESEARCH cannot hope to match the speed with which tropical forests are disappearing, four of the world's foremost tropical biologists have put together an ecological SWAT team ready to fly anywhere to do quick and dirty surveys of this vanishing resource. The team's mission is to get to remote, uncharted sites in the tropics and then use satellite imagery, aerial reconnaissance, and field surveys to come up with an inventory of species in just a couple of weeks, instead of the usual months or years.

The idea behind the Rapid Assessment Program, or RAP, is to gather data quickly that will help decide which tracts of imperiled tropical forests are the most deserving of protection—decisions that are all too often based on politics or opportunity, and not biology, says team leader Theodore Parker. The RAP team, started just last year under the auspices of Conservation International, has already visited tropical forests in northern Bolivia and western Ecuador. Over the next few years they plan to visit dozens of sites in tropical forests in Latin America, Africa, and Asia and then rank them in terms of their biological richness.

Radical though it may be, this program has won the praise of systematists and conservationists alike. To Edward O. Wilson of Harvard's Museum of Comparative Zoology, "It's an important method for spotting brushfires in the global attempt to reduce the extinction of species." Walter Reid, an ecologist in the biodiversity program at the World Resources Institute, calls it "enormously useful."

But, they add, RAP is not the whole answer in setting conservation priorities. Some, like Reid, point out that it ignores the key economic and social factors, like how the rain forest is already being used. Most of the grousing, however, comes from more academically minded scientists, who say that one week, even one month, is simply too short to find out what is going on in any ecosystem—no matter how good these four biologists are. And, perhaps more to the point, they are worried that this flashy new program will divert attention—and more important, scarce funds—from the in-depth surveys they say are needed.

"Long-term research is great, but I don't see how that fits with the immediate problem we have," responds RAP team leader Parker with obvious exasperation. "The Bolivians are setting up protected areas whether or not they have the [complete inventory of the] flora of Bolivia in their hands."

RAP had its origins in a series of conversations between Parker and Murray Gell-Mann of Caltech, a Nobel Prize–winning physicist and conservationist. Gell-Mann accompanied Parker on several of the natural history tours he used to lead in the tropics while working at the Louisiana State University. Both felt frustrated that too few biologists were working in the tropics, and that their research was going far too slowly, to be of much help in setting conservation strategy. Says Parker: "I realized there is no way in the world we would know enough in 20 years to decide [what land to set aside] in eastern Bolivia or parts of eastern Colombia or southern Venezuela, where few biologists have been."

The answer, they decided, was a new type of rapid assessment, which would leave behind some of the trappings of academic science—the painstaking collecting and cataloging of specimens—and instead concentrate on speed. They would visit dozens of sites over the first few years, not the relatively well-studied forests but the unknown ones, presumed to be rich in diversity and known to be threatened with obliteration. They would have enough money—perhaps up to $50,000 per trip—for high-tech equipment and the logistics of getting the crew in and out quickly. They would work closely with the biologists of the host country. And at the end of their stay, instead of writing up the definitive monograph—a process that can take decades—the team would brief local officials on what they found and then move on.

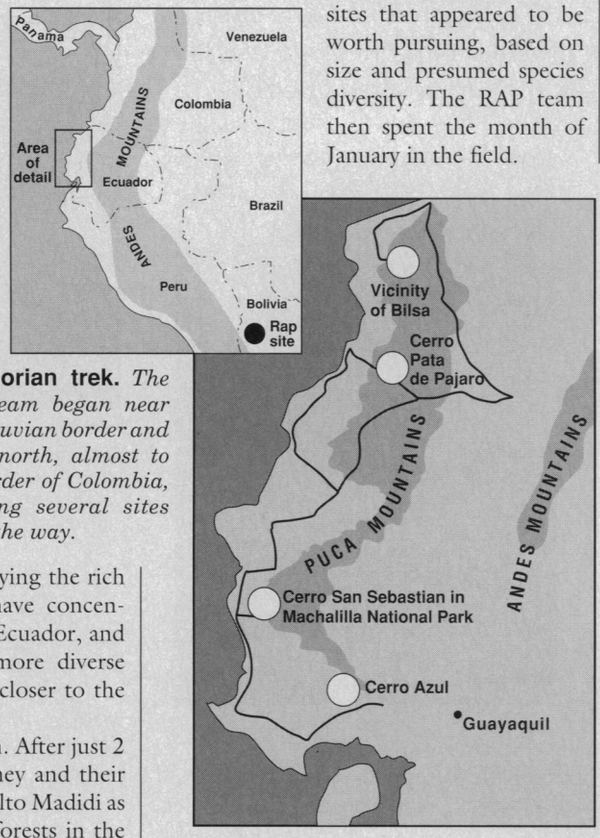
Gell-Mann sold Conservation International on the idea, though it didn't take much doing. "Everyone listens to Murray," says Parker. And as chairman of the MacArthur Foundation's world environment and resources committee, Gell-Mann was instrumental in securing a $750,000 start-up grant.

Still, Conservation International realized from the outset that money wasn't enough: RAP would work only if they could recruit people like Parker, who by virtue of their unique expertise could do in a week what would take normal mortals months or years. Parker, a self-trained ornithologist, can recognize nearly 3000 bird species by song alone. Give him one week in a tropical forest, anywhere from Mexico to Argentina, and he can identify about 95% of the bird species there.

After hiring Parker full time to run the team, they recruited three more biologists of his caliber: Alwyn Gentry, curator for the Missouri Botanical Garden; Robin Foster, an ecologist and botanist with the Field Museum of Natural History in Chicago, and

Louise Emmons, a Smithsonian Institution zoologist. Says Tom Lovejoy, assistant secretary for external affairs at the Smithsonian Institution: "They are some of the best in the game. Going into the field with Ted Parker is a revelation. The guy has an ear for bird songs you can't believe, and an enormous memory. Gentry and Foster are the equivalents in the botanical world. And Emmons really knows her stuff."

The first mission for the four scientists was a cloud forest in the Andean foothills in northern Bolivia, Alto Madidi, selected in part because of the favorable political climate. The Bolivian president recently called for an "ecological pause," or a ban on new logging, while the country sets conservation priorities. But Bolivian planners had little to go on, because biologists studying the rich eastern slope of the Andes have concentrated on the forests of Peru, Ecuador, and Colombia, presumed to be more diverse than Bolivia because they are closer to the equator.



Ecuadorian trek. *The RAP team began near the Peruvian border and drove north, almost to the border of Colombia, studying several sites along the way.*

Not so, found the RAP team. After just 2 weeks in the field last May, they and their Bolivian counterparts ranked Alto Madidi as one of the most diverse rain forests in the world. Heading out with his tape recorder at dawn, Parker identified 403 species of birds, which he thinks account for 95% of the total population, including nine species never before reported in Bolivia. Using his standardized sampling procedure, which enables him to compare diversity in different forests rapidly, Gentry identified 204 woody plant species within a quarter of an acre—a huge number—many of them new to Bolivia, and some new to science.

Though mammals are far more elusive, Emmons detected 45 species in her nightly prowls, including three reported in Bolivia for the first time: the short-eared dog, spiny-tree rat, and big-eared bat. She suspects that an equal number went undetected. What was most encouraging, says Parker, is the abundance of large mammals, such as tapirs and spider monkeys, which indicates that Alto Madidi is largely undisturbed by humans.

Work on RAP's second mission began last December when botanist Robin Foster and Brent Bailey, the RAP coordinator at Conservation International in Washington, D.C., rented a small plane and flew over the low coastal mountains of western Ecuador, an area selected because it is "incredibly threatened," says Parker. "About 90% to 95% of the original forest has already been destroyed. And within the next 10 or 20 years, all of the forest will disappear if steps are not taken to protect it." Foster, who has an uncanny ability to identify trees from the air, picked four sites that appeared to be worth pursuing, based on size and presumed species diversity. The RAP team then spent the month of January in the field.

What sets the Ecuadorian sites apart is not so much their diversity, says Parker, but the unusually large number of unique species they contain: Roughly one-fourth of the plant and animal species they found are thought to reside in western Ecuador alone. At Machalilla National Park, where the team surveyed moist forests isolated on ridge tops, Parker identified 20 to 25 montaine bird species that weren't known to exist outside the Andes. Similarly, Gentry found plants restricted to just one mountain top of a few square kilometers or less.

Parker and his colleagues are now writing up their brief reports on both Bolivia and Ecuador, which will be distributed widely to promote conservation. Buoyed by their initial success, the RAP team is planning trips to the montaine forest in southern Mexico in April, to Bolivia again in May, and then probably to Peru.

All of which is a bit too fast for some of their academic colleagues. No one questions that these four biologists can get a remarkable snapshot during their brief stay. But a few, at least, question whether that snapshot is sufficient to decide which lands to protect. "I think RAP is good at identifying areas that have a high species richness of trees and birds," says William Duellman, director of the Center for Neotropical Diversity at the University of Kansas. "But does that high species richness of trees and birds mean you will have a high species richness of other organisms there? You can't get that from RAP."

Instead, says Duellman, biologists need to look at other organisms less amenable to easy counting, like ants and butterflies and reptiles. And they need to do it not for 1 week, but probably 6 or 8 weeks at a stretch, once in the dry season and once in the wet. That is exactly what Duellman plans to do at numerous sites in the Amazon basin as part of the new BIOTROP program, begun in collaboration with Peter Raven at the Missouri Botanical Garden and Edward Wilson at Harvard. Indeed, with a grant from National Geographic, they already spent two seasons in the field in Cuzco Amazonico in Peru. But their ambitious plans for future trips may be foiled, Duellman worries, since the National Science Foundation just turned down the group's $1.8 million grant proposal to cover the first 3 years.

Duellman is still awaiting word from the MacArthur Foundation—the same foundation that has generously supported RAP. And that, says Reid of the World Resources Institute, may explain some of the tension between the two camps, which really aren't that far apart. Says Reid: "Everyone recognizes the need for both short-term and long-term studies. But there is a limited pot of money, so it ends up being a battle."

To Parker, the choice is clear: The urgent need to protect lands now outweighs the need for exhaustive inventories—though both would be ideal. He concedes, however, that some of the gripes about RAP are legitimate, saying that it would be nice to add a butterfly expert and a frog expert—provided "it doesn't bog us down."

In the end, Parker says, RAP will stand or fall on its political effect. "Whether or not we are successful has a lot to do with whether we can influence the conservation groups and governments that will be setting aside lands. It doesn't have much to do with whether or not we influence science." By that measure, RAP is already proving successful. A Bolivian conservation group, Friends of Nature Foundation, has already purchased part of Alto Madidi to protect it.

"We know we can influence decisions," says Parker. "And we know we will make mistakes. Look at the conservation movement in this country 100 or 50 years ago and some of the decisions they made. But if it weren't for Teddy Roosevelt and just a few others, we wouldn't have anything left in this country." ■ LESLIE ROBERTS