An early warning system for nature


M E E T T H E P E O P L E W H O M A K E I T H A P P E N.

S tabilizing our climate, reducing food insecurity, and conserving the biodiversity that underpins Earth’s life support systems are perhaps the greatest challenges of our time. If we are to succeed, we must have our finger on the Earth’s pulse. Leading scientists worldwide agree that we need an accurate and reliable record of the dynamics of biodiversity, ecosystem services and human wellbeing as they interact from local to global scales, particularly in the context of climate change.

Conceived in 2001, with significant support from the Gordon and Betty Moore Foundation, the Tropical Ecology Assessment and Monitoring (TEAM) Network – a partnership among 89 organizations in 18 countries in Africa, Asia, Latin America, North America and Europe – is uniquely positioned to meet this challenge. TEAM is focusing, initially on tropical forests, because of their role in sustaining life on Earth. Tropical forests absorb carbon dioxide and produce oxygen. They also stabilize climate, house about half of the species on Earth, and produce rainfall worldwide.

Integrating high-resolution remote sensing and strategically placed, standardized ground measurements, the Network distributes near real-time data and analyses to gain understanding at multiple scales:

The close-up: The health or growth rate of a single tree in a forest;

The wider area (one hectare): The health of that area of land, the biodiversity it sustains, and the value of its services, such as carbon sequestration;

The landscape (hundreds of km²): The role of that forest and the other ecosystems within a larger area, including how they affect freshwater flows, agricultural productivity, availability of wild food for the local community, and the resilience of natural and human systems to climate change;

The region (hundreds of thousands of km²): How the various landscapes in a particular region interact and how this affects carbon stocks, biodiversity, capacity to support people, and their resilience to climate change.

Demand for TEAM data, from scientists to policy makers, is growing. Scientists, such as NASA’s Jet Propulsion Lab in Pasadena, are using TEAM data to calibrate measurements from space of global carbon stocks and changes in the Earth system. And policy makers are using TEAM data to plan financial mechanisms for compensating local communities for conserving forests and for evaluating the effectiveness of conservation actions, such as creating nature reserves.

How does TEAM accomplish all of this? At each site, a local scientist, the site manager, coordinates the data collection, as well as interactions with local communities and government. The level of expertise and commitment of these scientists are extraordinary. They work in remote places, under difficult conditions, and sometimes must walk in the forest for three weeks to set up camera trap arrays. These are the people who make TEAM succeed. At the same time, being part of a global network connects the TEAM scientists to an international research community, and to opportunities for training and support for broader outreach.

In this magazine, I’m honored to introduce you to the TEAM site managers and to let them tell you about the TEAM Network through their eyes.

Through a Worldwide Network of Tropical Forest Sites, TEAM Tracks Changes in Biodiversity and Carbon Stocks.

Sandy Andelman
Vice President, Conservation International and Director, TEAM Network

LEFT: Established in 2008, Udzungwa Mountains National Park in Tanzania was the first TEAM site in Africa and contains outstanding biological diversity and endemic species.
PATRICIA ALVAREZ

Your days can go really crappy. Trust me.

I got this scar here. I’ve been stung by a sting ray, a scorpion... You can have a really, really crappy day. You lost a boat. Your gasoline was taken by the river. It’s raining. Your tent is invaded by ants. You have the worst day of your life and you’re ready to cry and say I hate this place. I hate the jungle. They should burn the jungle and put cement on it. I’ve said it. And then you see this little monkey looking at you. It can be a little frog, it can be a fungi that I’ve never seen in my life. And that’s it. That’s the magic of Cashu.

COCHA CASHU
PERU

The Cocha Cashu Biological Station is located in Manu National Park, which protects 14 ecological zones ranging from as low as 150 meters in parts of the Amazon Basin, to the Puna Highlands at an altitude of 4200 meters. Because of this topographical range, it has one of the highest levels of biodiversity of any park in the world. More than 3800 species of vascular plants, 230 species of reptiles and amphibians, 150 mammal species, and 230 species of macro fungi are found within Manu.
We measure five things:

climate, vegetation, carbon stocks, human–landscape interactions, and bird and mammal diversity. We started in 2002 and are the oldest site of the TEAM network.

Manaus is in the middle of the Brazilian Amazon. It’s a big city, we have almost two million people living there, and our sampling areas are not very far from Manaus. So, we can drive into the plots and it’s very interesting to study what is the consequence of the city in the middle of the forest.
The most exciting for me is the camera traps.

The camera trap data is going to be very important for the management plan of the park because so far there is no clear picture of what is in the park as far as animals. Sometimes when we go to town we have encounters with elephants, but we don’t know how many elephants are there. We don’t know where they are. So with the camera trap studies we are going to have a better understanding of what is in the park, where it is, how dynamic the population is and so on. It’s also important for the entire country because it’s going to set an example for how to monitor wildlife. I think it’s the first time that this type of equipment has been used in Cameroon.
It’s a privilege to say that Udzungwa is part of a global network. TEAM provides real time data for the whole world. By being part of the network we get to collaborate with other institutions and through that you share ideas and experiences, and learn new skills.

EMANUEL MARTIN

UDZUNGWA TANZANIA

The Udzungwa Mountains cover 10,000 square kilometers and contain outstanding levels of biological diversity and endemic species. The area contains 13 species of primates, including the Udzungwa red colobus and Sanje mangabey, and is considered one of the most important sites in Africa for primate diversity and conservation. The habitat outside the forest reserves has been heavily modified for human settlement and intensive agriculture, primarily the cultivation of sugar cane and rice. Established in 2008, Udzungwa was the first TEAM site in Africa.
To get to the scientific station we have to go by boat.

It’s a long way from the city of Belém. You have to travel by boat into the interior of the state for 12-14 hours. Then you get another boat and travel nine hours. It’s a long way but it’s a beautiful way. At the scientific station you have all of the things that you need. We have energy and internet. But to go to the TEAM plots you have to go by boat, too. All of the things that you have to do are by water. You always have to take a boat.
As a researcher, I think it's important to have good data.

And for the management of the nature reserve, you should know what you are managing. You will only know if you get good data. That’s why I’m supporting this work of TEAM and collecting data.

But it’s not just about the collection of data; I would like to communicate that data, not only on a scientific level, but more on a public level. Because if you can get the general public to know what is happening and what we have at the Central Suriname Nature Reserve, I think we will have much more ownership by the local people. So you won’t have problems of vandalism and maybe you will get more support from the government. That is how I see it, besides the scientific part, I would like to get this information to the policy makers and the general public.
Scientists come from cities. We are inept in the forest.

Yasuni is special because within Yasuni we have one of the most recently contacted groups of humans, called the Waorani. They are our neighbors. We live with them daily. There are several young Waoranis working at our team site, and they are our best allies because the protocols require moving large distances and probing very deeply into the forest. The Waoranis are incredible at what we see as dangerous and uncomfortable. For them it’s just their backyard. They know how to move. They know where to go and they take care of us. So we feel very comfortable having a Waorani guide. At the same time, I think they learn. A young man that lives in the jungle, very far from the city, has contact with science. This is a very interesting relationship.
A couple of us researchers went into the forest in Pasoh.

We collected some ants – just normal ants – and took them out to the local communities to do some outreach. We put the ants under a microscope and people were blown away. They never knew something that you see on a daily basis could look so different from a different perspective.

And so you can imagine what team can do. Once you show them, ok this is how a climate station works, now we can predict your weather using these models. Or, these are the animals you can see in your forest, in your backyard. I believe it will definitely create an awareness, especially among the younger generation.

I’ve already got people lining up who want to be involved in team and it’s not just as a laborer. They really want to learn about what’s going on and what the project’s about. I think it brings a positive vibe to the community, knowing that people actually are paying attention to what’s behind their houses.
RODOLFO VASQUEZ

There are stories about snake bites, but this isn’t very interesting.

There are various stories. The last two vegetation plots, for example, it took me 11 days to get to them. There are no trails inside the park and so I had to walk with eight people, four to look for the monitoring points and four people to carry things. The first eight kilometers was more or less flat and easy, but the other part was very difficult. We had to climb mountains and go with ropes and two of the porters quit. We had to carry the stuff ourselves. And so it took us 11 days to find the points. The forest is very thick, but finally we did it.
The other challenge we have is with elephants.

They are very curious, so every time they see those camera traps they come close and they check. Every year we lose at least one camera trap that has been damaged by an elephant. They really spend a lot of time in front of the camera. You get 100 pictures of just one elephant touching it with their trunk, moving it, going back and forth, and trying to find out what it is and how to get rid of it. They’re very curious and intelligent. They know that this is something unusual.
Everybody cannot work in the whole world.

Team is a team. We work together and we achieve together. That’s what we need right now because I’m not able to work in Cameroon or Tanzania or somewhere else, but I can work in Mudumalai, and I can contribute from Mudumalai. The others can contribute from Madagascar or some other place. That’s what I think we can achieve from team.

Mudumalai
India

The Mudumalai Wildlife Sanctuary is located in the foothills of India’s Nilgiri Mountains. Its terrain is undulating and plant species diversity is spectacular due to a strong rainfall gradient. The reserve has more than 675 species of angiosperm plants, 210 of which are trees. It’s also home to over 80 species of birds and many large mammals, including several in danger of extinction, such as tigers, leopards, wild dogs, striped hyenas and sloth bears.
JEAN CLAUDE RAZAFIMAHAIMODISON

**My favorite part is that I can get in contact with people from all over the world.**

That is very important because exchanging ideas and results gives me information that could help me improve the work in Ranomafana National Park.

RANOMAFANA
MADAGASCAR

More than 90 percent of Madagascar’s forest has been lost. At more than 43,000 hectares, Ranomafana National Park has some of the highest diversity of primates and land snails in the world. As in all Madagascar, bird species diversity is low. Ranomafana also contains a vast array of amazing frogs and reptiles.
JOHANNA HURTADO

TEAM is very committed to building a network that collects standardized data.

For me it’s a huge challenge to build a network. All of the sites have very different constraints, very different conditions, so to create a network is very difficult. I think the strategy of TEAM to create an alliance with other people is the best way. And it is very important for me to be part of that.

VOLCÁN BARVA
COSTA RICA

The Volcán Barva TEAM site is located within both the La Selva Biological Station and the adjacent Braulio Carrillo National Park. Volcán Barva spans an elevational gradient from 50 to almost 3000 meters above sea level on the Caribbean side. The 47,500 hectares features a mixture of lowland tropical and montane forest with more than 1850 species of plants, 350 species of trees, 448 species of birds, and approximately 500 species of ants.
ALEX MCWILLIAM

One of the great strengths of the TEAM Network is that you’re not only a site.

We obviously do things at a site level and we use the information at a site level. But it’s also being part of a bigger partnership, globally, with several organizations: TEAM, Conservation International, the Wildlife Conservation Society, Missouri Botanical Garden, and Smithsonian Tropical Research Institute. These are all different organizations that are ultimately working towards a common goal.
BUKIT BARISAN
INDONESIA

Bukit Barisan Selatan National Park is the third largest protected area on the Indonesian island of Sumatra, stretching for 150 kilometers along the Barisan Mountain Range. The long, narrow park is surrounded by coffee and black pepper agriculture in one of the most densely populated provinces in Sumatra. Locally, the park provides an enormous range of economic and ecological benefits, such as maintaining water quality for communities. Wildlife in Bukit Barisan includes large mammals such as elephants, tigers, and rhinos, as well as six primate species and a diverse bird community, including six species of hornbills.

MEYNER NUSAWELO

If I know something is true, if I believe in something, if I know it’s good for everybody, I have nothing to lose. We must remain optimistic in conservation.
BADRU MUGERWA

I find it amazing that a small group of people came up with this idea.

Now it has grown to a global scale and it’s an honor to be part of this network. It’s already part of the TEAM vision, expanding more, having 40 sites. So I think my work is to keep it going.

It’s not all about collecting data for a PhD study over three years and then keeping your data on a shelf. We need something long-term going on, and data shared on a global scale, just the way TEAM does it.

I think if we’re going to help other life survive, regardless of all the threats we are facing, it has to be a joint collaboration. We have to join hands to help other species to live, to continue existing.

BWINDI UGANDA

Bwindi Impenetrable National Park is one of the few forests in East Africa where lowland and montane ecosystems meet. The park supports at least 120 species of mammals, and is famous for its rare and endemic species. It contains about half of the world’s mountain gorillas. As its name suggests, the landscape is extremely rugged, with steep ridges and narrow valleys. The only level areas within the park are swamps. Bwindi lies within a densely populated rural landscape, and tourism is a major source of revenue to park authorities and local people.
is benchmarking powerful new surveillance, analysis and mapping systems for analyzing and forecasting – at multiple scales, from a plot to the planet – critical changes to the health of tropical ecosystems. In partnership with the San Diego Supercomputer Center in the US, TEAM has developed cutting edge cyberinfrastructure and analytical tools that support – for the first time – near real time, open access to integrated data on climate, biodiversity, and ecosystem services in tropical forests. With the analytical framework, TEAM can quantify the contributions of ecosystem services to human livelihoods and the effects of human activities on the flow of services, and provide early warning of impending system collapse before it is irreversible.

PARTNERS
TEAM is a partnership among 89 organizations in 18 countries. The core partners – Conservation International, Missouri Botanical Garden, the Smithsonian Institution and Wildlife Conservation Society – have made commitments to maintain the Network’s core infrastructure and to provide capacity building.

ANALYSIS
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LEARN MORE
For more information or to download data, go to TEAMNETWORK.ORG

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UGANDA
Albertine Wildlife Foundation
Albertine Rift Conservation Society
Bwindi Impenetrable Forest Conservation Trust
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Facebook of the forest

TEAM’s Terrestrial Vertebrate Protocol utilizes the world’s largest system of camera trap arrays to monitor biodiversity. Each array consists of 60 camera traps at a density of one trap per two square kilometers. The cameras photograph passing mammals and birds.