

# THE BIG TREE PROJECT

HOW DRONES ARE MONITORING DEFORESTATION IN PERU



Jason Scullion launches a drone for its first flight over Las Piedras, Peru.  
Image by Sam Zwicker.







Article by  
*Madeline Becker*

How big is a  
**BigTree?**

**M**ahogany, Spanish Cedar, and the Chiawako tree have a significant presence in the neo-tropical areas they are indigenous to. These big trees are a keystone in the collective ecosystem of the forest. They provide habitats for countless species and are impressive in their sheer size alone. They can reach heights of 200 feet (61 meters) and diameters of 80 centimeters. However, under the threat of illegal logging and other forms of deforestation, their numbers have been dwindling rapidly. While the heights of these trees can be measured easily, the number of how many big trees that are actually left is much harder to determine. It is impossible to maintain current data on deforestation from the ground. From above, however, conservation drones have the potential to gather the current, extensive data needed to make progress in the conservation of big trees.

Unmanned aerial vehicles, most commonly known as drones, are multi-purposeful surveillance devices. In the context of conservation, they can easily be used for mapping forests, surveying biodiversity, and monitoring environmental threats such as logging. This summer, Dr. Jason Scullion and intern Sophia Winkler-Schor brought that technology to the Las Piedras River in Peru. Jason is currently an

**MORE THAN  
80% OF EXPORTED  
MAHOGANY IN  
PERU IS LOGGED  
ILLEGALLY**

**MAHOGANY  
POPULATIONS  
HAVE DECLINED BY  
70% IN THE LAST  
60 YEARS**

assistant professor at McDaniel College and the board president of the non-profit Wild Forests and Fauna (WFF). Sophia is a fourth year dual-degree studying Environmental Science and Resource Management, and Environmental Studies at the University of Washington. The two met in 2012 when Jason was the Teaching Assistant for Sophia's Environment 100 class. After working on research together in 2013, the two traveled to Las Piedras, Peru this summer to work on a new WFF venture called The BIG Tree Project.

Before this summer, Jason had already worked in Peru on a 10-month Fulbright fellowship. While he was there, conversations about the importance and rapid loss of big trees in the area sparked the inspiration for The BIG Tree Project. It is common knowledge that big trees in the rainforest are threatened by extensive illegal logging, but it is difficult to maintain current data on the issue. Very often, by the time data is collected from the ground, not much can actually be done with it. In other words, there is no easy or inexpensive way to either monitor real-time deforestation or gather useful data. The primary goal of The BIG Tree Project is to use conservation drones in order to gather that missing data and to raise awareness about the importance of big trees.

An abundance of technology is required to set up and operate the drone correctly. Jason and Sophia used software called Mission Planner in order to program exact flight path. Their input data included known locations of several big trees. Jason and Sophia used those coordinates in order to establish a basic parameter. Mission Planner automatically filled in that parameter to generate a complete flight path. That programming controls the "brain" of the drone, which controls the cameras and the drone body. Once the brain is programmed, every action of the drone can be controlled automatically from the ground. All that Jason and Sophia had to do was physically launch the drone into the air. After that, the drone was able to fly, record data, and land on its own.

The body itself is a relatively non-descript Styrofoam piece from China. The cameras used to record imagery aren't too complex, either. The first is a standard crop sensor Canon point and shoot, and the second is a GoPro Hero. The Canon camera is hacked with **CHDK** software and is mounted to the bottom of the drone. It captures all of the images used for mapping. The GoPro is mounted at the top of the drone and serves as a visual flight log. **(continued)**





A beautiful big tree on the Las Piedras River, Peru. Image by Jason Scullion.



Jason Scullion and team prepare drone for first mission. Image by Sophia Winkler-Schor.

(Continued from previous page)

After a mission, images from the point and shoot camera are run through a program called Visual SFM in order to generate a high-resolution mosaic. Another program called CMVMPS takes the same input data and uses it to produce high-resolution 3D terrain models. It allows researchers to use these datasets to identify and monitor locations of big trees. The aerial function of drones allows researches to easily see which trees are being logged and when.

Other projects across the globe are using drones to help maintain current conservation efforts. A project in Belize called “Eyes Over the Sky” is monitoring the coral reef in order to help the government tackle illegal fishing issues. Another project in Indonesia is using drones to track orangutans in treetop canopies. Animals are tagged once with

GPS chips that transmit signals to the drone. If researchers need to gather more information on tagged animals, they can then navigate the drone to transmit GPS coordinates. This eliminates the need for recapture—which is a very stressful process for animals.

Without the efforts of organizations like WFF and the technology they use to support their work, big trees and the ecosystems that they seek to protect would continue to disappear. With the right tools, conservationists like Jason and Sophia can accurately measure and track the effects of illegal logging of large trees. Current data is the next step in protecting the increasingly dwindling forests of the world. Together, with new technology like conservation drones, we can be more effective in protecting big trees and our environment.

See the official [Conservation Drones](#) website for countless video summaries and an [interactive map](#) of other projects around the world.

The CMVMPS software is designed to generate topographical maps. It was developed by University of Washington students and is currently unavailable for public use.



# The **BIG** Tree Project Heads to the Amazon



WFF produced a video to document their conservation efforts in Peru. Click the play button to view it externally on YouTube.

Wild Forests and Fauna takes an exciting trip to the Peruvian Amazon to launch The BIG Tree Project. Dr. Jason Scullion and Sophia Winkler spent 10 days on the Las Piedras River mapping the region using a drone. The goal was to assess the habitat type and quality of the forest, whilst looking for big trees. The BIG Tree Project aims to protect BIG trees through business innovation, technology and education.

