

[crickets]

[cymbal plays]

[chime]

[music plays]

[NARRATOR:] African elephant populations are severely threatened, from habitat loss and from poaching fueled by the international ivory market.

[music plays]

[CHASE:] We're losing elephants at an alarming rate. The statistics that are coming are... 100 elephants a day.

[NARRATOR:] Scientists estimate that in the 1970's, the area occupied by elephants spanned the African continent, and included 1.3 million forest and savanna elephants. Today, the known elephant range is much smaller. How many elephants remain, and precisely where they live, is not clear. Collecting this information will help focus conservation efforts on areas where elephants are in danger.

[airplane engine noise] [CHASE (over radio):] How many Kell?

[LANDEN (over radio):] I said 8, but it could have been 9.

[CHASE:] We were given this remarkable opportunity to conduct The Great Elephant Census. To count elephants across the continent of Africa, because their figures are unknown.

[NARRATOR:] Mike Chase is principal investigator for The Great Elephant Census. The aerial survey covers most of the range of African savanna elephants. The intensive two-year effort involves over 100 researchers in 20 countries and is scheduled to be completed in 2016.

[CHASE:] We'll be flying thousands of hours in a fixed-wing aerial plane. It requires a lot of logistical planning and the support of governments to allow us, to give us their permission to fly over their countries to count these elephants.

[airplane engine noise]

[NARRATOR:] In aerial surveys, researchers divide the total census region into survey areas. Different teams then count the animals in a survey area from the air, taking either total counts or sample counts. A total count is when all the animals seen in a survey area are counted. Counting every single elephant in all survey areas is not practical on such a massive scale. The Great Elephant Census teams have instead opted to take careful and consistent sample counts. Using this method, only animals found in

sections of a survey area are counted. The resulting numbers are then used to estimate the overall counts, based on a mathematical algorithm.

[CHASE:] The sample count is the most reliable method we have to estimate elephant numbers over a very large area and at a fraction of the cost.

[FREDERICK:] I am here as a technical advisor to help set up the aircraft and to audit the processes of getting the data. My job is to make sure that we absolutely trust the data that's coming in. Setting up a sample count is much more difficult than setting up a total count. A sample count is sampling the small area next to the aircraft in each side and you're multiplying up the density that you find there to the whole area.

[NARRATOR:] Each survey area is marked with parallel lines, called transect lines, that run perpendicular to major landscape features, such as rivers and mountain ranges. The aircraft then flies along the transect lines from 300 feet above the ground. Two researchers, each looking out the left or right side of the plane, count animal sightings within 150-meter-wide strips on both sides of the transect line. To delineate the counting strips, the team attaches two measurement wands to the plane.

[FREDERICK:] The observer sitting inside the aircraft can see out through the wands. And that we call the counting strip. And that's dependent on the height, which in our case is measured by a laser altimeter to 300 feet above ground level. Translates to 150 meters on the ground that the observers are counting. A group of animals is counted only if they are inside here. If part of the herd is outside, you don't count them. The cameras are very, very important in determining what is inside and outside of the strip. Because the human eye is not very good at cutting through a group and saying "just that bit." Inside the strip is a known area, so we are going to actually calculate the density of the animals that we see. We count a known number of animals just in that known area. And that is where all our estimates come from later on.

[FREDERICK:] This has actually been bent in now.

[FEMALE VOICE:] OK

[FREDERICK:] This is part of the pre-flight. We need to have somebody on this every morning.

[FEMALE VOICE:] Yep, I agree. [FREDERICK:] 49.

[FREDERICK (interview):] The width between these two rods is where all the numbers come from. And if that width changes by 5 to 10%, in this case that would mean an extra or fewer 1,500 animals out of the population. So everything is crucial to actually making sure the observer has exactly the right conditions to see exactly the right strip on the ground.

[NARRATOR:] Following these standard protocols is critical for consistent data collection, when several research teams and partner organizations are involved.

[FREDERICK:] At the beginning of a transect, the pilot and Mike, as the co-pilot, will say "start transect," and the observers will actually then focus, they will get in the exact right position, and watch for the next half hour. Every animal that comes up, they press a button to trigger the photo, and call out the numbers that they see, call out the species.

[LANDEN (on radio):] Elephants, Mike. [CHASE (on radio:)] Go ahead.

[LANDEN (on radio):] I would say 4, and 3 giraffes. Nice.

[NARRATOR:] The team is in the air for about 3 hours to complete a particular survey area.

[FREDERICK:] You often don't see animals for hours at a time. You're sitting in a buzzy little airplane, it's incredibly loud, sometimes the heat is 53 degrees in the aircraft and you can't move. It's incredibly hot, uncomfortable and difficult at times. Not for the faint of heart.

[LANDEN (on radio):] Oh wow! [FEMALE VOICE (on radio:)] What is it?

[LANDEN (on radio):] 11 elephants.

[NARRATOR:] Voice recorders capture the numbers, and GPS-equipped cameras are used to verify the observer's sightings.

[camera shutter snaps]

[LANDEN:] Well, it felt really good to be up there, a little dry still, very dry. It's really nice to see the elephants. Big bulls, lovely big bulls. Some decent numbers.

[LANDEN:] Transect 2 is 17 through 28.

[NARRATOR:] Data collected during each flight is entered into a database. Researchers then use an algorithm that combines the number of animals counted, the size of the area surveyed, and the number of transects flown, to estimate how many elephants are in the survey area. The numbers collected for all survey areas will then be added up to determine the total savanna elephant population.

[music plays]

[FREDERICK:] It's extremely important for us to get these numbers right, because they go straight into management. And they let the managers and the politicians decide how to actually intervene with what's going on in a protected area.

[CHASE:] The purpose of the census is to motivate and inspire decision makers with information that they previously did not know about or did not have.

[music plays]

[NARRATOR:] Upon completion and analysis, The Great Elephant Census will be the most accurate large-scale count of African savanna elephants ever done. It will form the basis for planning ongoing conservation efforts and studies of elephant ecology.

[music plays]