Endangered species: Scientist discovers the cause of the decline of the technicolour Gouldian finch

by Ben Collins at ABC Kimberley, Australia

One of the world's most colourful birds has been rapidly disappearing from across northern Australia for decades, but now a scientist has discovered what's killing Gouldian finches and shown the trend can be reversed.

When Sarah Legge arrived in the Central Kimberley ten years ago as chief scientist for the Australian Wildlife Conservancy at the Mornington-Marion Downs sanctuary, she realised the gaudy Gouldian finch needed to be a research priority.

"When we first arrived at Mornington, we really needed to find out what was making these birds tick and what we could do to make conditions better for them," she told Vanessa Mills on ABC Kimberley Local Radio. As recently as 50 to 100 years ago, large flocks of the birds formed moving rainbows across Northern Australia. "People would report seeing them in flocks of thousands. Now if you imagine the colours of one bird and then multiply that up by thousands, it must have been an absolutely spectacular sight," Dr. Legge said.

But around 40 years ago people started to notice Gouldian finches were disappearing rapidly. The large flocks are gone, and the finch is presently listed as an endangered species. "Now they're only found usually in rather small groups of four to six birds and mostly in the Kimberley, some in the NT, and very rare sightings in Queensland. So it's quite a dramatic reduction," said Dr. Legge.

Where have all the finches gone?

Trapping for the [Australian] pet industry, introduced predators and disease are all suspected as possible causes for the decline. As a specialist seed eater and tree-hollow nester, fire is also suspected as part of the Gouldian finch's problems. Dr. Legge wanted to determine once and for all exactly what role fire was playing. "Instead of just simply going out and counting birds in different areas, we used quite a novel approach. We would catch birds and then give them a full physical," she said.

By measuring the health of Gouldian finches and relating that to the recent fire history, Dr. Legge discovered that the birds were very sensitive to the impacts fires were having on a critical food plant. "The birds rely on a couple of species of spinifex for seed at that changeover [time] from the late dry to the early wet. Those particular spinifex species will only produce seed if they've not been burnt frequently. So they need two or three years without fire before the seed will actually come out on the flower stalks," she said.

This meant that in areas where grasses had been recently burnt, there was little seed and the finches were running out of food. "What we found is that when birds are living in areas with frequent fire, they lost a lot of condition, a lot of health in that December-January-February period, to the point where many individuals were dying," Dr. Legge said.

Applied science

The importance of Dr. Legge's work in revealing fire's role in the decline of Gouldian finches was brought home when the impact was reversed by careful management of fire across a huge area of the Central Kimberley. "We've been working with our neighbours for the past seven or eight years, particularly in a program called Ecofire, designed to change fire management across big landscapes," said Dr. Legge. An increase in the numbers of birds has been the satisfying culmination of Dr. Legge's work. "Not only were we able to find a really important cause for the decline in Gouldians, by applying the right management intervention we were then able to reverse the problem. So it was a very powerful bit of science and very useful for our management."

Citation: Legge, S., Garnett, S., Maute, K., Heathcote, J., Murphy, S., Woinarski, J. C., & Astheimer, L. (2015). A landscape-scale, applied fire management experiment promotes recovery of a population of the threatened Gouldian finch, Erythrura gouldiae, in Australia's tropical savannas. PloS one, 10(10), e0137997.

Using multiple lines of evidence *Avian Science in Action* Name: _____

Use the diagrams (Legge, et al., 2015) provided as well as information from the reading to answer the questions.

Q1: What information is provided in the diagram at the right?

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Q2: Make a claim as to what you observe in this diagram. (What had occurred from 2006 until 2011?)

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Q3: Cite the evidence that supports your claim here:

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Q4: Explain your reasoning below. How does your evidence support your claim?

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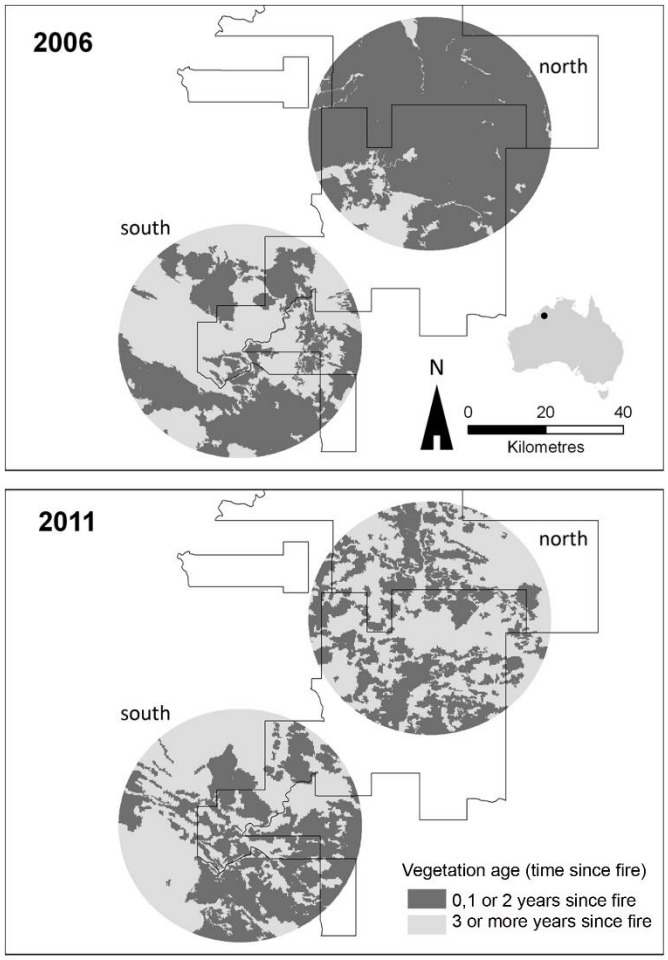

Hematocrit is the percentage of red blood cells that make up the volume of blood in the body. Normal values usually range from 40% to 60%. If there is a high percentage of RBCs, it usually means the individual is dehydrated (less water in the blood). If the percentage of RBCs is low, the individual is anemic. Stress caused by changes in the environment can impact this value. The diagram below shows the hematocrit of the finches both pre-fire and post-fire.

Q5: Using the diagram below, explain the difference between populations in the North and South.

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Q6: Also using the diagram below, explain the differences between pre-fire condition and post-fire condition in each area.

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Q7: Based on this new evidence, how does this support your claim above?

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