PENGUIN WATCH

Count penguins for penguinwatch.com

Help researchers count penguins in photos taken in Antarctica and sub-Antarctica by time-lapse cameras. University of Oxford researchers are crowdsourcing penguin conservation, with global implications for management.

Globally, seabirds are in decline, and even in Antarctica most penguin species are in decline. Conservation policy is often undermined by a lack of data, particularly in such remote regions. Without effective conservation underpinned by data, the Antarctic Peninsula could be very different in 50 years.

A basic premise of wildlife conservation is that we need to be able to audit populations – to record whether they are stable, increasing or declining. This 'data gap' is particularly evident when we need to understand which of several possible threats are actually affecting the environment.

Along the Antarctic Peninsula, Chinstrap and Adélie penguins are showing rapid declines, while Gentoo penguins and whales are slowly increasing.

We now need to understand whether fishing, climate change or direct human disturbance is causing these changes – but how? Conventional monitoring is logistically difficult and hugely expensive in Antarctica, because it usually requires a summer camp or a scientific base. However, many of the sites are visited by tourists or scientists once a year. Since 2010, Dr Tom Hart from the University of Oxford, Department of Zoology has been using International Association of Antarctica Tour Operator (IAATO) vessels to access sites all around Antarctica, and leaving time-lapse cameras that record penguin behaviour year-round.

Start counting penguins now at penguinwatch.org.

In the first year of launch, Penguin Watch had over two and a half million hits, processing nearly half a million images and counting over 50 million penguins! Over 6 million images have now been classified, and some of this information is being used to train an automatic recognition tool. The techniques associated with this project are being spun out to remote islands around the world, including in the Arctic.

These cameras overlook penguin colonies and take many images per day and can therefore record the number of penguins turning up to breed (and when they arrive), the timing of breeding and chick survival. By increasing the number of images, these cameras can even record how long penguins spend at sea foraging for food, and how often they feed their chicks. This is a sensitive, early warning indicator of stress that allows us to compare many areas and work out which threats are causing declines.

However, the real trick is what to do with all of this data. Dr Hart's team now monitors over fifty sites around the Southern Ocean. Collaborators in the US and Australian Antarctic Division monitor even more. The team collects over 500,000 images per year and the 'data deluge' is increasing. That's where the Zooniverse stepped in – another Oxford University project based in the Department of Physics. The team at Zooniverse developed *Penguin Watch*, a citizen science project which allows volunteers to click on penguins and generate valuable data.

"Animals are basically very good at survival – that sounds obvious, but it's important. It means that population counts are slow to respond – they record problems that have already happened. Just like us, animals work very hard to raise their young. Recording how hard they have to work and how many offspring survive is a much more sensitive indicator of environmental stress than adult mortality.

"Therefore, on top of population surveys, we need more of these sensitive, early-warning indicators to compare fished versus unfished, visited and unvisited sites to work out what is causing declines."

Dr Tom Hart