

Global warming could cause goat populations to rocket

March 20 2013, by Harriet Jarlett



Higher temperatures caused by global warming could help goat populations to thrive, say scientists.

A new study, published in *Oikos*, shows that two major factors are important for [goats](#) survival – daylight hours and temperature – which get worse the further north you are.

The research used a catalogue of feral goat populations – made in the 1980s using NERC funding – to map where they lived. The team discovered that no populations could survive above 60 degrees latitude, unless farmers brought them in at night to protect them from the cold. North of this line temperatures in winter are too cold, food too sparse and days too short for goats to stay alive.

But warming [global temperatures](#) could make conditions bearable at these [higher latitudes](#). The researchers looked at one specific population on the Isle of Rum, off the northwest coast of Scotland, to see how they were responding to climate in relation to day length.



'As temperatures have started to climb by bits of a degree over the last half century we've been seeing the numbers of goats on the Isle of Rum increasing,' says Professor Robin Dunbar from the University of Oxford, who led the study.

Currently, the goats living on Rum barely have enough winter daylight hours to eat in. At these higher latitudes the goats struggle to keep warm. The colder it gets the more food they need to maintain their body temperature and the more time they spend feeding. But in colder [weather](#) the quality of vegetation deteriorates too, so a goat needs even more eating time to get enough energy to survive.

'The further north they go, the more the goats are trapped by a combination of the costs of thermoregulation and declining vegetation

quality, both of which require them to spend more time feeding. But winter day lengths get shorter as you go further north. There comes a point where those two opposing forces crash together and they run out of time. That's the point north of which goats can't live,' explains Dunbar.

But as the climate changes – bringing warmer temperatures – goats need less food and less time foraging to survive. 'As the climate warms, goats will be able to live further north. It's about one degree latitude further north for every one degree warmer in mean annual temperature. Although here in the UK this may be offset by changes in the Gulf stream and other climate factors,' says Dunbar.

High latitude goat populations, like the one the team studied on the Isle of Rum, were teetering on the balance of maintaining their numbers. 'Rum is very close to the northern limit for goats in Britain so it's no surprise that they're only just about able to hold their own. In better years the population builds a bit and then in a bad year it falls, mainly thanks to low fertility and high kid mortality. The [population](#) seemed to be oscillating comfortably around a decent mean for many decades,' Dunbar says.

Recently though, many of these northerly populations have thrived and begun to show signs of increasing. Dunbar thinks this is an effect of the increase in temperature as a result of climate warming.

Rising populations of goats have caused huge problems in some areas, most famously in the Galapagos. Many oceanic islands have become overrun by goats who destroyed the vegetation and ate the ground bare. But Dunbar stresses that it is unlikely to ever to get this bad in Britain: 'Even under the worst climate change scenarios we're not going to be basking in tropical palm trees in Britain, so it's very unlikely we're going to get the ecological disasters seen in the Galapagos.'

'In some respect, goats have got a bad reputation. They're often not themselves the cause of habitat degradation, it's just that they're very good survivors. When well managed, they can be good landscape managers,' he concludes.

More information: Dunbar, R. I. M. and Shi, J. (2013), Time as a constraint on the distribution of feral goats at high latitudes. *Oikos*, 122: 403-410. [doi: 10.1111/j.1600-0706.2012.20596.x](https://doi.org/10.1111/j.1600-0706.2012.20596.x)

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