Climate change could alter the gender ratios of American alligator offspring

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A team of researchers affiliated with multiple institutions in the U.S. has found that rising temperatures due to climate change could lead to changes in the gender ratios of the American alligator. In their paper

published in the journal *Proceedings of the Royal Society B*, the group describes measuring the temperature of alligator nests in different parts of the alligator's range.

Unlike mammals, the gender of many reptiles is determined by the temperature in which eggs are nested. The American alligator is one such example—it lays its eggs in a nest and then the temperature inside the nest determines whether the offspring will be male or female. Prior research has shown that if the temperature in the nest is between 32.5 degrees and 33.5 degrees Celsius at a critical point in the development of the eggs, the offspring will be mostly male. If the temperature is above or below that threshold, the offspring will be mostly female.

In this new effort, the researchers went out into the bogs, swamps and backwoods areas where alligators reside and collected alligator nest temperatures. In all, they collected data on 86 nests, making sure to obtain data on nests in both the most northern and most southern regions to account for temperature extremes. They found that the gender ratio in the offspring of alligators could shift due to temperature fluctuations as small as 1 degree Celsius. They also found that average temperature increases as small as 1.1 degrees to 1.4 degrees Celsius could tilt gender ratios toward more males. This suggests that if conditions in the area where the alligators live experience an increase in temperature of just a few degrees, most of the alligators born would be male—that is, unless the temperature goes up enough to swing the ratio the other way, with nests producing mostly or all females.

The researchers suggest that American alligators could be in danger of disappearing if the planet continues to warm unless they are able to move to more northerly environments. They note that reductions in the numbers of alligators or their disappearance altogether would have a profound impact on the places they live. This could lead to a reduction in alligator holes and dens, which are used by other creatures after the

alligators move out, and animals that serve as prey for alligators would likely see surges in populations.

More information: Samantha L. Bock et al, Spatial and temporal variation in nest temperatures forecasts sex ratio skews in a crocodilian with environmental sex determination, *Proceedings of the Royal Society B: Biological Sciences* (2020). DOI: 10.1098/rspb.2020.0210