

ScienceWatch

Global Warming: The Birds-eye View

Scientists have finally agreed on something that birds have apparently known for quite some time. An article on global warming in the February 29, 2000 *New York Times*, states that..."a special study by the National Research Council, the research arm of the National Academy of Sciences, declared that...surface warming is apparently real".

Meanwhile, a study conducted in the Chiricahua Mountains of southern Arizona over a 30-year period, and published in the May 1999 issue of the *Proceedings of the National Academy of Sciences*, had already documented the effect of global warming on the Mexican Jay (*Aphelocoma ultramarina*). The study team, headed by Jerram Brown from SUNY at Albany and the American Museum of Natural History, documented the earliest egg-laying date for female jays they began banding in 1971. Each individually recognizable female was monitored in subsequent years for the date of laying of the first clutch of spring. The team found that the jays are laying their eggs earlier each year. In 1998 eggs were laid 10 days earlier than in 1971. This advancing of the jay's reproductive clock appears to be linked to the warmer temperatures occurring during March and April, the months leading up to the breeding season. Brown, et al. found that mean daily temperatures have crept up 2.7°C (4.9°F). The region has not warmed up, but rather the nights have become less cold.

Breeding time for birds should obviously occur when they can obtain lots of calories for egg laying and for their growing chicks. Other studies have shown that passerine birds commonly lose almost 10% of their body weight during cold nights. By placing tiny scales in the nests to measure overnight weight loss, Brown has confirmed this for the Mexican jay. Warmer nights allow the nesting females to conserve calories, and the warmer air may provide more calories for egg laying by rousing insects earlier in the year.

A pioneering study, done in 1932, had shown that in a related corvid, the American crow (*Corvus brachyrhynchos*), the onset of breeding was linked to photoperiod. While photoperiod must also be important for the Mexican Jay and has remained unchanged, the jay must also have some built-in flexibility for timing its breeding in response to a changing climate. It might be interesting to re-examine crows for a similar response.

Another study documenting warm weather effects on birds and published in the February 4, 2000 issue of the journal *Science*, involves the national bird of Norway, the dipper (*Cinclus cinclus*). In an equation-filled paper, a team headed by Bernt-Erik Saether and Jarle Tufto of the Norwegian University of Science and Technology has analyzed 20 years of observations by amateur bird watchers. Their analysis reveals that, despite annual fluctuations in numbers, the dipper population shows an upward trend, which is associated with the milder winters resulting from an atmospheric pressure system called the North Atlantic Oscillation. That system has brought warmer winters to northern Europe during the last 30 years and has benefited the dipper by preventing streams from

icing over. The team developed a mathematical model that predicts a 58% rise in dipper numbers if the mean temperature rises 2.5°C (4.5°F).

Global warming is, however, not beneficial to all. According to a study published February 15, 2000 in the *Proceedings of the National Academy of Sciences*, American robins (*Turdus migratorius*) are now arriving in the Colorado Rocky Mountains 14 days earlier than they did in 1981. The team, headed by David Inouye from the Universities of Maryland, Kansas, and California at Davis has found that although lower altitudes are experiencing a longer growing season due to warmer spring temperatures, higher altitudes remain snow-covered for 18 days after the robins arrive, making foraging difficult.

If we look to other animal studies published in the last few years, we see that the effects of global warming on a given species are unpredictable. Many butterfly species in Europe and North America have successfully shifted their ranges northward, but some are in trouble because by moving northward to a more suitable climate they are faced with a habitat that has already been gobbled up by urban sprawl. Twenty of the 50 frog species known to occur in the Costa Rican cloud forest have become extinct. Their disappearance correlates with warmer temperatures that push the clouds higher up the mountains and dry up the lower slopes.

According to the *Times* article, global mean temperatures have risen about 1.0°F in the last century and are predicted to rise 2-6°F in the next century. How will animals in our national parks fare when climate changes force them to move outside their protected boundaries? Even now, Montana's official policy is to shoot any North American bison (*Bison bison*) that wander out of Yellowstone because ranchers fear that brucellosis (cattle fever) will spread to their herds. Will we convert ranchlands and towns surrounding Yellowstone, Glacier and other parks to parkland in order to protect bison and other large mammals from hunters? What do you think?

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