

Where birds fly offers clues to man

May 11 2011, By Bruce Henderson

Each December a hardy flock of birdwatchers scatters across Mecklenburg County in North Carolina for the National Audubon Society's Christmas Bird Count, which has tracked bird movements for more than a century.

Here's what the numbers say about Charlotte's birds: They're moving north as temperatures warm. Eighteen of the 20 most common backyard species spotted last Dec. 27 have shifted their winter ranges northward over the past 40 years, national data show. The average distance was 116 miles.

Polls show Americans are increasingly dubious about global warming, even as most [climate scientists](#) say they're ever more sure that it's real. Oblivious to science and politics, Carolina wrens and cedar waxwings seem to signal climate change with their wings.

The evidence is firmest in North Carolina on the coast, where a state science panel expects a 1-meter increase in sea level by 2100 and beach towns are scrambling to save eroding strands.

Charlotte's birds are among the hints of statewide shifts as temperatures inch higher. The tendency is northward and upward: stonefly nymphs moving higher up mountain streams; coastal frogs croaking in Piedmont backyards; tropical fish cruising the temperate coast.

Even scientists convinced of climate change are wary of claiming proof that it's at work. More often, they say such indicators fit the patterns one

might expect from a [changing climate](#). And they note that more powerful forces, such as habitat loss, also are reshaping the state.

"It's not just climate change we're facing," said Paul Super, a science coordinator at [Great Smoky Mountains](#) National Park, where armadillos and South American [fire ants](#) have appeared.

"It's the pressure of an increased population and increased use of the park, of exotic species being introduced, of atmospheric deposition with metals. All of that is stressing the park in one way or another, and climate change is just another stressor."

North Carolina's average winter temperature has risen about 1 degree since 1981. Multiyear droughts have scorched the Carolinas twice in the past decade. A water war between the states reached the Supreme Court. The Arbor Day Foundation put Charlotte in a new plant-hardiness zone in 2006, and area golf courses are replacing bentgrass greens with more heat-tolerant Bermuda.

Climate models say more volatility lies ahead: warming temperatures, stronger hurricanes, more floods and droughts.

But models can't reveal problems we haven't yet imagined, said ecologist Steve McNulty, a U.S. Forest Service climate researcher based in Raleigh.

Deep in the Carolinas' drought of 2000 to 2002, previously healthy red spruce trees began dying on Mount Mitchell. The trees were being killed by Southern pine beetles, which bore their way into trees. Normally they're kept at bay by the cool temperatures of high elevations.

Scientists found that airborne nitrogen blown from coal-fired power plants in Ohio had increased the trees' number of needles, while

shrinking their roots. The fertilized trees grew well - until drought struck.

During the dry spell, the needles quickly sucked up available water in the soil but their skimpy roots couldn't find more. Without water, the spruce couldn't make the sap that repels the beetles. The insects invaded and quickly killed the trees.

Researchers never would have suspected the one-two punch of acid rain and climate change could have triggered such fast, fatal results, McNulty said.

"Interactions that we have not envisioned will likely cause an increasing number of unexpected and unwelcomed surprises in the future," he said. "What makes them so disturbing is that if we're not looking for them, we're going to be least prepared to deal with them when they occur."

SIGNS OF CHANGE

Across North Carolina, scientists are trying to understand how climate change may affect the state's plants and animals. Among them:

Trees

Trees' ability to grow and produce seeds is more sensitive to climate than previously thought, Duke University scientists reported recently. Their 18-year study of trees in the Southeast found that risk factors from earlier springs to summer droughts make some species especially vulnerable.

Climate change poses a serious potential threat to the vast Eastern forests, other researchers say. A key concern is stress on the genetic integrity of tree species, including their ability to cope with new threats

such as exotic insects.

Maps based on climate models, developed by scientists from the U.S. Forest Service and North Carolina State University, predict that the range of many familiar species will shrink in the Carolinas this century. New habitat sprouts to the north, some as far away as Canada.

Ants

As social insects, ants are good indicators of how other such animals - including people - react to environmental changes. North Carolina State biologist Rob Dunn decided to see what would happen if he turned up the heat.

Dunn and his colleagues use enclosed chambers on forest floors in Durham and Massachusetts to simulate future warming. The ants that have thrived in the warmth also are some of the least-known, even to experts.

"We're seeing species we don't know a lot about becoming more abundant," Dunn said. "The broader reality is that as warming occurs we're going to see species rise up that we don't know very much about at all."

That has implications good and bad. Native ants favor us with ecological services such as dispersing seeds. Non-natives might carry diseases and become pests, as anyone who has stepped on a fire ant mound knows.

Birds

Ruby-throated hummingbirds have lingered more often on the Carolinas coast in winter since the mid-1990s, says York County, S.C., naturalist Bill Hilton Jr., and increasing numbers are wintering farther inland.

On March 27, Hilton banded a male ruby-throat that tied his earliest spring date for the species. He caught a young, female bird last Oct. 14, his second-latest banding date for the species in 27 years. Hummers from California or Arizona also have begun to show up.

"I don't think the (Western) birds are necessarily an indicator of climate change," Hilton said, "but the ruby-throats might be."

Sea level rise

Rising water levels threaten the marine nurseries that nurture young fish species from speckled trout to southern flounder.

If barrier islands fragment, coastal scientists say, the protected estuaries will become more like open ocean. Sounds would turn saltier and open to larger predators.

"It could totally change our nursery system, slowly, over time," said Anne Deaton, habitat protection chief for the N.C. Division of Marine Fisheries.

Invasive species

Non-native invaders also are moving northward and may thrive in a changing climate, scientists say.

"That's the major threat to native species," said plant ecologist Qinfeng Guo of the Forest Service's Southern Research Station in Asheville. "A lot of endangered species already have limited habitat on mountaintops. The native species have nowhere to go, and non-natives take over."

Opportunistic and adaptable, species such as bittersweet and privet find a Carolina climate much like that of their native territory. They're quick

to take hold in disturbed areas, such as ground cleared for construction.

[Climate change](#) and development, Guo said, are "a perfect combination" for the intruders.

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