BEHIND THE SCENERY

Global warming could spell trouble for the Smokies high country, or not...

Will Climate Change Affect Life in the Great Smoky Mountains?

Everything is different in the mountains, even the possible impacts of global warming or "climate change."

In one sense, the Smoky Mountains have a natural buffer that might ease some of the negative impacts of rising regional temperatures. For hundreds of thousands of years plants and animals in the southern Appalachians have responded to warming temperatures by moving up in elevation and to cooling temperatures by moving down. This advantageous ability to find more hospitable environs just by moving up or down slope a few hundred feet is one of the main reasons the Great Smoky Mountains have such a world famous diversity of flora and fauna—they haven't been wiped off the map every time glaciers advance or sea levels rise.

Yet this upward and downward mobility has its limits. What happens to Fraser fir and red spruce, Northern flying squirrel and Red-cheeked Salamander—species that already live at the mountain tops—when the temperatures rise? They are already at the highest elevations in the East, and northward routes along the spine of the Appalachians are blocked by long stretches where the mountain range is relatively low and the climate is warmer.

According to Keith Langdon, Inventory & Monitoring Coordinator at Great Smoky Mountains National Park, many species "are at risk of getting squeezed off the tops of the mountains."

And this is not good news for biological diversity. High elevations in the southern Appalachians are "islands in the sky" filled with hundreds of types of plants and animals that live nowhere else on earth. Even in the case of Smokies high elevation species that are also found in places like New England and Canada, our local varieties are often genetically different than their brethren in the North. Smokies brook trout, for example, are genetically and visibly different from brookies in Michigan and Maine. The same is true with ginseng and Saw-whet Owls.

But, again, things are different in the mountains. Dr. Jason Fridley of Syracuse University has spent the last few years scattering nearly 200 tiny thermometers all over the Smokies. Though his work is still very much preliminary, the data does pack some surprises. In a nutshell, Fridley's numbers indicate that the high elevations and streamsides in the Smokies are so damp that rises in regional air temperatures don't have much effect on them. Especially beneath the forest canopy, a couple feet above the ground, where Fridley sets his instruments, and where most plants and animals live. "It appears these wet, shady areas need to dry out before they start warming," Fridley said.

Elsewhere in the Smokies, in lower, sunnier, drier places like Cades Cove there is not the moisture to buffer increases in regional air temperatures.

Which raises an important question: Will climate change bring wetter or drier conditions to the southern Appalachians?

"Right now the precipitation forecast models are all over the place," Fridley said.

A warmer, drier future might mean that plants and animals at the lower and middle elevations move up the mountainsides and species at the high elevations become extirpated or extinct. Such a future could also usher in more forest fires and force the northward migration of species like fire ants and armadillos to the lower elevations of the Smokies.

A warmer future where precipitation stays the same or increases could mean that species from the south move into the lower elevations and existing species at the high elevations manage to hang on.

"Instead of comparing the drive from Gatlinburg to Clingmans Dome to a trip from north Georgia to Maine, it could be more like a trip from south Florida to Maine," he added.

Climate Change Stats

11 Number of the last 12 years that have been the warmest worldwide since 1850.

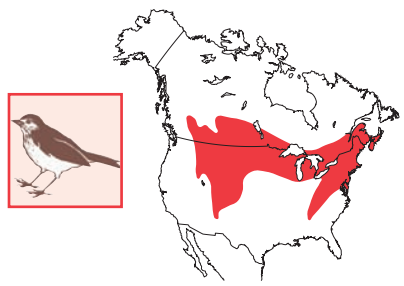
2.3 Number of degrees F. that temperatures have risen since 1969 in the Walker Branch watershed in Oak Ridge, TN.

2.0-11.5 Number of degrees F. temperatures are projected to rise worldwide this century.

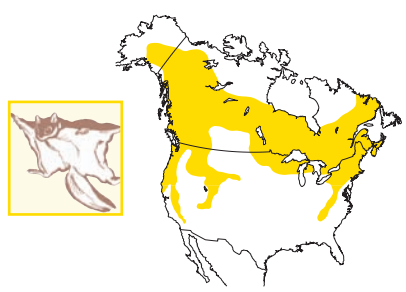
1.0 Number of degrees F. the ocean surface temperature in the Northern Hemisphere is increasing per decade.

What's at Stake?

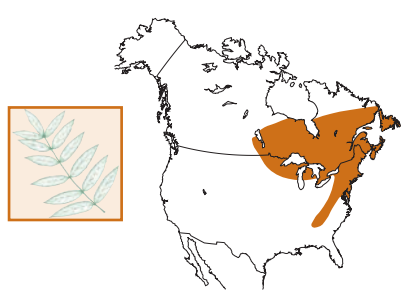
Yellow birch trees are common above 3,500' in the park, where they achieve record size. They are easily recognizable by their peeling, horizontally-striped bark.



The Veery is famous for its beautiful, flute-like song. It's found above 3,500' in the Smokies where it nests and raises its young.



The northern flying squirrel is an endangered species. In the Smokies it lives in the spruce-fir forests at the park's highest elevations. Flying squirrels can glide for over 200 feet.



American mountain-ash trees live only above 5,000' in the Smokies, where they are at the southern limits of their range. They are noted for their spectacular displays of vivid red berries from early autumn into winter.