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Warming Trends

Heat Invades Cool Heights Over Arizona Desert

By TIMOTHY EGAN

Correction Appended

SUMMERHAVEN, Ariz. — High above the desert floor, this little alpine town has long served as a natural air-conditioned retreat for people in Tucson, one of the so-called sky islands of southern Arizona. When it is 105 degrees in the city, it is at least 20 degrees cooler up here near the 9,157-foot summit of Mount Lemmon.

But for the past 10 years or so, things have been unraveling. Winter snows melt away earlier, longtime residents say, making for an erratic season at the nearby ski resort, the most southern in the nation.

Legions of predatory insects have taken to the forest that mantles the upper mountain, killing trees weakened by record heat. And in 2003, a fire burned for a month, destroying much of the town and scarring more than 87,000 acres. The previous year, another fire had swept over 32,000 acres.

“Nature is confused,” said Debbie Fagan, who moved here 25 years ago after crossing the country in pursuit of the perfect place to live. “We used to have four seasons. Now we have two. I love this place dearly, and this is very hard for me to watch.”

The American Southwest has been warming for nearly 30 years, according to records that date to the late 19th century. And the region is in the midst of an eight-year drought. Both developments could be within the range of natural events.

But what has convinced many scientists that the current spate of higher temperatures is not just another swing in the weather has been the near collapse of the sky islands and other high, formerly green havens that poke above the desert.

Fire has always been a part of Western ecology, particularly when the land is parched. But since the late 1980s, the size and reach of the fires have far exceeded times of earlier droughts. And the culprit, according to several recent studies, is higher temperatures tearing at a fabric of life that dates to the last ice age.

“A lot of people think climate change and the ecological repercussions are 50 years away,” said Thomas W. Swetnam, director of the Laboratory of Tree-Ring Research at the University of Arizona in Tucson. “But it’s happening now in the West. The data is telling us that we are in the middle of one of the first big indicators of climate change impacts in the continental United States.”

And it comes at a time when millions of Americans are moving to these places. Since 1990, more than eight million homes have been built in Western areas that foresters call “the urban-wild land” interface, also the focus of recent federal firefighting efforts.

The fear is that what happened to Summerhaven is a taste of things to come. As heat-stressed ecosystems provide fuel at the edges of new homes, catastrophic fires could become the new normal. Dr. Swetnam compares it to new developments in hurricane-prone areas in the

Southeast.

Others say the projections are overly alarmist, and note that fuel buildup is a legacy of fire repression, not necessarily higher temperatures. They also say the higher reaches of the West may simply be evolving into less alpine settings, and could resemble life that exists at lower elevations.

Still, there is a broad consensus that much of the West is warmer than it has been since record keeping began, and that changes are happening quickly, particularly in places like the sky islands.

“The West has warmed more than any other place in the United States outside Alaska,” said Jonathan T. Overpeck, a University of Arizona scientist and co-author of the recent draft by the Intergovernmental Panel on Climate Change, released last month in Paris.

A trip up to any one of the 27 sky islands shows the ravages of heat on the land. The forests are splotched with a rusty tinge, as trees die from beetle infestation. Frogs with a 10,000-year-old pedigree have all but disappeared. One of the sky islands is the world’s only habitat for the Mount Graham red squirrel, an endangered species down to its last 100 or so animals.

For the squirrel, the frog and other species that have retreated ever higher, there may be no place left to go.

“As the climate warms, these species on top of the sky islands are literally getting pushed off into space,” Dr. Overpeck said.

The Coronado National Forest, which includes Mount Lemmon and Mount Graham, lists 28 threatened or endangered species. Heat has greatly diminished the web of life that these

creatures depend on, and they “have not evolved to tolerate these new conditions,” Forest Service officials wrote in a report on the declining health of the sky islands.

For people moving to the breezy pines to escape desert heat, the fires that swept through places like Summerhaven can be terrifying. Fire comes much earlier, and much later, in the season.

“You can tell the weather is changing,” said Michael Stanley, head of the water district here, which lost two-thirds of its customers after the fire. “The snow melts earlier. The fires are big. It makes life very interesting.”

On her regular hikes around Mount Lemmon, Ms. Fagan has noticed many changes. She recently saw a type of rattlesnake that usually lives in the lowlands, and — while hiking over snow — was surrounded by gnats.

“I’m standing on snow while swatting away gnats,” she said. “I said, ‘Oh my God, what are these guys doing out in the winter?’ ”

Last year, wildfires burned nearly 10 million acres in the United States — a record, surpassing the previous year. The Forest Service has become the fire service, devoting 42 percent of its budget to fire suppression last year — more than triple what it was in 1991.

The current drought is not nearly as bad as the one in the 1950s, or one in the mid-16th century, but it has caused a huge forest die-off.

The only difference this time around is higher temperatures, said David D. Breshears, co-author of a study published by the National Academy of Sciences on the subject.

The increased heat, Dr. Breshears believes, is the tipping point — stressing ecosystems in the Southwest so quickly that they are vulnerable to prolonged beetle infestation and catastrophic fires.

“The changes are so big, and happening so fast,” Dr. Breshears said. “We saw it happen all the way up the elevation grade and across the region.”

Dr. Swetnam, who said he used to be skeptical about some of the projections on Western landscape changes, came to a different conclusion after studying fires. Since the mid-1980s, about seven times more federal land has burned than in the previous time frame, he found, and the fire season has been extended by more than two months.

Dr. Swetnam laments the loss of areas unique to the Southwest.

“The sky islands have existed since the Pleistocene,” he said, “and now with these huge fires you stand to lose some unique species.”

All of which should be a caution to people moving to reaches of the desert prone to dramatic change.

“The Chamber of Commerce doesn’t like people like me saying things like this, but large parts of the arid Southwest are not going to be very nice places to live,” Dr. Swetnam said.

Here at Summerhaven, Ms. Fagan, who lost her home and gift shop to the fire, is staying put, even though she knows — firsthand — about the changes under way on the sky island where she built a business and raised her two boys. She made her last mortgage payment on her house a few months before the fire took it.

“We lost 90 percent of our community and two-thirds of our mountain to fire,” she said recent one warm morning. “There may be nothing left to burn. But I can’t ever leave this place. I love it too much.”

Correction: March 31, 2007

A front-page article on Tuesday about the effects that higher temperatures have had on the so-called sky islands of Southern Arizona misstated the year that fire destroyed 32,000 acres near Mount Lemmon, Ariz. It was 2002, not 2004.

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