



*Effects of climate
change on the birds
and bees ... and
trees: Part 2*

by Marilyn Loser

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The first installment of this column discussed effects of climate change on the birds and bees. Now, let's consider trees. Trees don't have the ability to migrate as quickly as birds. And many trees rely on bees for pollination and birds to distribute their seeds. The two most important climate change factors for trees are heat and moisture. And it's not just the amounts of heat and moisture, but the timing of temperature change and precipitation.

For example, on the San Luis Valley floor, some pines don't thrive because their leaf buds open only to be frozen by our cold spring nights while those in the warmer, surrounding mountains do fine. Also, conifers have a once-a-year opportunity to put on new growth. If there isn't enough moisture in the system, they won't generate new spring growth. On the other hand, many deciduous species can sprout new growth throughout the growing season when the climate permits.

According to ScienceDaily.com, the most extensive and detailed study to date of 130 North American tree species concludes that expected climate change this century could shift their ranges northward by hundreds of miles and shrink the ranges by more than half. Daniel McKenney, investigator for the study says ranges may decrease sharply if trees cannot disperse seed in altered conditions. They used computer modeling based on three well-known models of global climate, and assumed both decreasing and increasing carbon dioxide emissions during the century. Results were similar under all conditions.

Another 18-year study of 27,000 individual trees conducted by the National Science Foundation found trees' ability to produce viable seed is more sensitive to climate change than previously thought. What is compelling about this study is that they didn't use modeling; they visited each of the 27,000 trees at least every three years!

Their study shows that summer drought is an important, but often overlooked, risk factor for tree survival, and that species of four types of trees--pine, elm, beech, and magnolia--are especially vulnerable to climate change. Look around, the San Luis Valley has a lot of pine and elm. Drought stressed trees are more prone to disease and infections.

Mountain pine bark beetles have killed about 3.5 million acres of lodgepole pine forests in northwestern Colorado over the past decade, wiping out 90 percent of pine forests in that area, according to Thomas Veblen of the University of Colorado. During the same time period, spruce bark beetles also killed large areas of spruce forest in northern and southwestern Colorado.

Those of us who have lived in this region for some time are very aware of the pine bark beetle that devastated many pinon pines in the Valley and northern New Mexico several years ago in severe drought conditions.

The death rates of trees in Western U.S. forests have doubled over the past two to three decades, according to a study spearheaded by the U.S. Geological Survey and published in Science Magazine. They suggest the deaths are driven in large part by higher temperatures and water scarcity linked to climate change. The same study notes that the death of older trees is rapidly exceeding the growth of new ones, akin to a town where the deaths of old people are outpacing the number of babies being born. Some reports suggest that hotter, drier summer conditions prevent seeds from germinating as easily as in the past.

Of course forest fires are responsible for the destruction of a lot of trees. (See the July 20 AlamosaTrees.net article "Forest Trees and Wild Fires.") Severe drought and high winds in the southwest have fueled a devastating wildfire season. The Alamosa air was filled with smoke from New Mexico and Arizona fires earlier this summer. There are more than 60 wild fires in Texas as I write this and the Bastrop wildfire near Austin has destroyed more than 1400 homes. News clips show blazing, drought-stricken forests.

Jerry Franklin of the University of Washington notes that it's not just about the death of trees. He said, "Some of the west's most imperiled animal species, such as the northern spotted owl, depend on old-growth trees for critical habitat."

I sit at my keyboard fidgeting and wondering how to conclude this column. As I reread the articles I researched for this column I look for a ray of light, a direction we can take to help protect our environment. Rather, I see comments such as that by Michael Goulden, an ecologist at the University of California, Irvine, in response to one climate change study with which he didn't necessarily agree. "Still, the paper makes a valuable contribution, further documenting a worrisome trend the world should be watching," Goulden said. "I'm convinced the authors are describing a large, widespread, real, and important phenomenon."