Bloomin' Lilacs!

Geographer's research shows spring is coming earlier

by Laura L. Hunt

A UWM climatologist has discovered something winter-weary Wisconsinites can cheer about. Spring is coming earlier – and has been since 1959, says Mark Schwartz, an associate professor of geography.

Schwartz studies climate as it relates to phenology – the annual reawakening of plants each spring. His work has improved predictions about when plants will emerge from dormancy.

Atmospheric conditions (such as temperature and moisture) and day length are important for plants, whose survival depends on synchronizing their life cycle with the seasonal cycle of the elements.

Schwartz's findings – and his methods – are considered a vital tool in studying the effects of global climate change.

"Scientists don't have a single data collection method that gives us the whole picture of changing conditions each spring," says Schwartz. "That's what I'm working on."

Using the dates of "first leaf" and "first bloom" in lilacs, and temperature records from around North America, Schwartz has found that early onset is particularly evident for the northeastern and northwestern United States.

Beginning with data from 200 sites in North America where ground monitoring of the growing season had been recorded for at least five years, he juggled multiple variables and created a way to fill in the gaps. He calculated a model that would predict when the lilacs' first-leaf would have occurred where no data existed.

The study also included satellite images of the continent's annual green-up. The results of his work correspond to findings of comparable studies in Europe.

"I have tuned the model so that it takes into account annual and geographic variation in different parts of North America," he says.

Using the model, his research showed that spring arrived five to six days earlier between 1959 and 1993. The earlier dates became especially pronounced from 1978 to 1990, when first-leaf dates occurred earlier at a rate of about one day per year.

ALAN MAGAYNE-ROSHAK ('72)

Mark Schwartz found a way to better predict when spring will arrive.

Schwartz's studies are even more interesting when compared to another UWM study by ornithologists Peter Dunn and Linda Whittingham in the Biological Sciences Department. Their research found that nesting of tree swallows in North America occurred nine days earlier between 1959 and 1991.

"The air contains different amounts of water vapor and carbon dioxide at different times of the year. So it's not just that spring is coming earlier (for plants)," Schwartz says. "The question is, what are the implications for the other levels of life?"

While his work doesn't address why temperatures are growing warmer, it does suggest that scientists need to further explore the interconnectedness of all the biological players.

"The next step is to be able to model a whole proxy ecosystem," says Schwartz. "Look how much we've gotten out of just this little piece of the puzzle. Think how much more we could learn if we had more data from various species, or more on insects and other animals."

Publishing articles in this research area since 1986, the most recent in the International Journal of Climatology, Schwartz has gotten a lot of attention from other scientists.

"It is not often, in these days, that the work of an individual scientist changes the direction that science takes," says Bruce Hayden, professor in the Department of Environmental Sciences at the University of Virginia.

Schwartz also has attracted nearly $550,000 in extramural research awards since 1994, has been published in the journal Nature, and received a UWM Foundation and Graduate School Research Award last fall.

Next, Schwartz will spend a year on sabbatical working with data from the National Climate Data Center in Ashville, N.C.

"My goal," he says, "is to get the largest pool of temperature information to run my model on. Ultimately, I hope to apply it worldwide."