Climate change predicted to drive trees northward

December 3 2007

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 kilometers and shrink the ranges by more than half. The study, by Daniel W. McKenney of the Canadian Forest Service and his colleagues, is reported in the December issue of *BioScience*.

McKenney's study is based on an extensive data-gathering effort and thus more comprehensive than studies based on published range maps. It includes data from Canada as well as from the United States. Observations of where trees are found are used to define the "climate envelope" of each species.

If the trees were assumed to respond to climate change by dispersing their progeny to more favorable locations, McKenney and colleagues found, ranges of the studied species would move northward by some 700 kilometers and decrease in size by an average of 12 percent (with some increasing while others decreased). If the species were assumed unable to disperse, the average expected range shift was 320 kilometers, and "drastic" range reductions of 58 percent were projected. The authors believe that most species will probably fall somewhere between these two extremes of ability to disperse.

The climate measures studied were chosen to represent important gradients for plants: heat and moisture. Two climate change scenarios were modeled. One assumed that carbon dioxide emissions would start

to decrease during the coming century, the other that they would continue to increase. Each scenario was investigated with three well-known models of global climate, with broadly similar results.

The authors note that their study investigated only a sample of the 700 or so tree species in North America, and that under climate change, new species might colonize the southern part of the continent from tropical regions. A companion article by the same authors provides more detail about their climate envelope method as applied to one species, the sugar maple.

Source: American Institute of Biological Sciences