Climate Change and Long-Term Ecological Research

Perhaps I am biased (I am), but the need for long-term research to understand ecological dynamics is a no-brainer. Given the short-term interests that characterize government officials and research administrators, it is truly remarkable that the Long Term Ecological Research (LTER) program funded by the National Science Foundation (NSF) is now more than 40 years old. This is a testament to both the quality of LTER research and the continued support from science administrators at the NSF. Although the managing philosophy at the NSF seems to have shifted from one of growth to the more Hippocratic “do no harm,” interest in long-term ecological research among ecologists remains quite high. The NSF recently commissioned the 40-year decadal review of the LTER program, the fourth in a series of such reports. The report was overwhelmingly positive about the value of the LTER Network. They emphasized that the major strength of LTER was, and continues to be, site-based research. On the other hand, the review team concluded that LTER was “in the early stages of embracing the distributed network of sites” and that LTER was “at a transition point in its trajectory” to ask cross-site and continental scale questions. I find this conclusion completely mystifying.

I have been associated with LTER for more than 30 years. Over that time, I have had the pleasure of participating in several cross-site working groups and synthesis projects, starting in the mid-1990s. Furthermore, network-level synthesis publications have appeared in many journals, including article collections that were published in BioScience in 2003, 2012, and the current issue. I would argue that the network has long embraced cross-site research. Undoubtedly, cross-site synthesis means different things to different people. It is worth noting that, unlike the National Ecological Observatory Network, the US LTER Network, over the more than 40 years of its existence, has been built as a hodgepodge of 28 independent sites with relatively independent research foci. Some sites are only a few years old; other sites have conducted research for even longer than LTER has existed. Some sites have been shut down, and one site rose from the dead. Consequently, cross-site synthesis can be challenging, given the heterogeneity of sites, themes, and research histories. But that has not prevented the LTER Network from embracing synthesis and conducting cross-site comparisons. Admittedly, it is often easier and more logical scientifically to integrate results across subsets of LTER sites rather than the network as a whole. Indeed, that is the structure of the current set of LTER articles on ecosystem responses to climate change appearing in this issue of BioScience. Syntheses were aggregated into forest and freshwater ecosystems, coastal and pelagic systems, and drylands. As is noted by Jones and Driscoll in their introduction to the special section, each site within these clusters is buffered by different aspects of climate change and human activities. But, despite this heterogeneity, long-term research has identified commonalities regarding how diverse ecosystems are responding to a complex set of drivers under global environmental change. We are pleased to publish this set of articles as climate change continues to intensify and the LTER Network enters its fifth decade of research.

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