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Policies for Biodiversity

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BioScience

Organisms from Molecules to the Environment

American Institute of Biological Sciences

Policies for Biodiversity

The overview article by R. Edward Grumbine on China's emergence and global sustainability, which begins on p. 249, is an unusual one for *BioScience*. Geopolitics is not, and never will be, our primary area of interest. Nonetheless, there are compelling reasons for biologists to be aware of the titanic influence that China's development is having on global systems as well as on its own biodiversity.

Although the country is poor in natural resources, and its per capita use of important commodities remains low, its huge human population—a fifth of the Earth's total—ensures that it leads the world in the consumption of all major industrial commodities. With its burgeoning growth, China is expected to become the world's largest economy sometime around 2030. Rapid urbanization and road building in the west of the country threaten its high biodiversity, and its air pollution, including particulates, wafts halfway around the globe to the United States. Unsurprisingly, China could be the world's largest emitter of carbon dioxide by 2015.

This sobering fact—together with the fact that global carbon dioxide emissions from the use of fossil fuels and cement production increased by 8 percent over the last 15 years, according to the Intergovernmental Panel on Climate Change—is reason enough to believe that, as Grumbine suggests, the United States should have policies aiming not only to reduce its own emissions but also to secure emissions reductions from China. The need for such a course would be apparent even if sea-level rise were the only predicted effect of global warming. A Project Apollo–scale US effort to develop low-emission technology would, needless to say, make that course more feasible.

Biologists need no reminding, however, that sea-level rise is not the only consequence of warming. Improved modeling of the likely effects on biodiversity is an obvious priority, and Daniel Botkin and his coauthors have important things to say on that subject in the article that begins on p. 227. Current projections of extinction rates from warming are probably overestimates, they maintain, because the models used to make such projections overestimate the observed frequency of extinctions when applied to Quaternary ice ages. A critical examination of the causes shows that many of the models rest on simplifying assumptions that can lead to bias. Greater use of the fossil record and of modern genetic studies could, the authors hold, improve forecasting methods. But there are many other possible improvements, and Botkin and colleagues point the way toward an integrated framework that would consider multiple causes of biodiversity change when projecting extinction rates.

The implied criticism of some earlier work might raise some hackles, but biologists would do well to take the lesson seriously. Only when there is a strong consensus about the magnitude of predicted effects of warming on biodiversity will the governments of the United States, China, and other countries be likely to factor that all-too-real threat into their policymaking. There could hardly be a more important challenge than achieving that consensus.

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