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Response

We are grateful for the comments of Nearing and colleagues. First, we express our admiration for the USLE and RUSLE, for the thousands of plot-years of data required to derive them, and for the scientists who have developed and improved them over the past half-century. Because they are based on plot data, these equations predict gross erosion rather than net erosion, as stated by Nearing *et al.* These equations were developed for agricultural and other land development planning, and for those purposes, they have no peer. However, when one goes from the plot scale to field, regional, or national scales (geomorphological scales) and to long time periods (the scales, of almost a quarter of a century, of the National Resource Inventory), then results are problematic and problems of interpretation can occur (*1*).

Nearing, Norton, and Zhang recently stated that "[s]omewhat over half the approximately 5 billion tons of soil eroded every year in the United States reaches small streams" (*2*). Because this figure refers only to agricultural erosion, significant amounts must be added for nonagricultural erosion (for example, roadside gullies and construction) and ongoing geologic erosion (*3*). But even the minimal amount specified above would mean that more than 2.5 billion tons of sediment reach U.S. streams each year. This is more than five times the annual sediment yield of U.S. streams of 0.5 billion tons (*4*), which itself is largely augmented by channel and bank erosion (*5*). Thus, a minimum net average of more than 2 billion tons of sediment from agricultural erosion must be deposited in streams and on floodplains each year. Where is it? Such mass would be unevenly distributed so that deposits would be deep and accumulating rapidly in some places, and thus be easily detectable. But no one has found this missing mass, to our knowledge. Accounting for the other half of the 5 billion tons—presumably lost as colluvium on fields or between fields and streams—is also problematic. Surely, soil scientists would be finding and systematically reporting on such rapid accretions of colluvium. Such large predicted masses must eventually be accounted for, because only about 1% of eroded soil is soluble.

Although we applaud the limited verification of the equations over the past 20 years, verification of national erosion rates must take place at the geomorphological scale taken on by the National Resource Inventory to be scientifically acceptable, and this clearly has not been done. Having been concerned with field measurements of sediment for more than 30 years, we appreciate the effort it takes to make such field measurements, and we apologize if we implied that it was easy. However, usable data, especially for off-farm damages, will require hard work. We look forward to scientists' use of different approaches at different scales, working together to ascertain problems and prescribe solutions.

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6. We thank T. Diehl, R. Evans, and W. Renwick for ongoing discussions.

Thoughts on the Causes of Tree Mortality in Appalachia

In an article on the history of atmospheric sciences by Paul Crutzen and Veerabhadran Ramanathan (Pathways of Discovery, "The ascent of atmospheric sciences," 13 Oct., p. 299), there is a picture of dead trees in the Great Smoky Mountain National Park (p. 301). The caption indicates that these are red spruce (*Picea rubra*) that have died from acid rain fallout. First, the trees pictured are most likely Fraser fir (*Abies balsamea*) and, if so, they died from an introduced insect, the balsam woolly adelgid (*Adelges tsugae*), not from air pollution. Second, mortality rates for red spruce in the southern Appalachians are not elevated above what are considered to be normal background levels.

And finally, there is no scientific evidence that the pictured trees—or, for that matter, trees anywhere in the eastern United States—have died from either acid rain or ozone pollution. This statement should not be construed to mean that air pollution is not a problem. Rather, it simply emphasizes that air pollution in the eastern United States has not yet reached levels that allow researchers to make a direct link to tree mortality.

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Editors' Note

Although many trees have been damaged by acid rain, an environmental fact that the image was intended to illustrate, the particular tree damage apparent in the picture is most likely due to insects. The editors regret the error.

Insects, not air pollution, were most likely the culprits.

CORRECTIONS AND CLARIFICATIONS

News Focus: "For 'father' of abortion drug, vindication at last" by M. Balter (6 Oct., p. 39). Although Gregory Pincus held a titular faculty appointment at Boston University, he did not perform his pioneering research on the oral contraceptive there, as stated in the article. That work was done at the research institute he cofounded, the Worcester Foundation for Experimental Biology in Worcester, Massachusetts.

NetWatch: "Computer nostalgia" (29 Sept., p. 2235). The Computer Museum History Center is located in Mountain View, California, not Palo Alto.

News of the Week: "Element 107 leaves the table unturned" by R. F. Service (25 Aug., p. 1270). In the penultimate paragraph, the chemical name of BhO_3Cl is bohrium (not barium) oxychloride.