

Response to *BioScience* Paper on Forest Loss

The April 10 issue of *BioScience* includes an article by Drummond and Loveland (D&L) titled “Land-use Pressure and a Transition to Forest-cover Loss in the Eastern United States.” The article is a product of the U.S. Geological Survey’s Land Cover Trends (LCT) project, a major effort to monitor land-use and land-cover change across the United States through rigorous interpretation of satellite images.

Drummond and Loveland (D&L) analyzed 500 randomly selected sample-block locations in 20 ecological regions stretching from the Atlantic coast westward through the Mississippi Alluvial Valley Loess Plains and the Interior Plateau ecoregions in Mississippi, Tennessee, Kentucky, Indiana, and Ohio. They examined satellite imagery from selected years (1973, 1980, 1986, 1992, and 2000) and concluded that “an important land-cover transition has occurred, from a mode of regional forest-cover gain to one of forest-cover loss caused by timber cutting cycles, urbanization, and other land-use demands.”

There is much to commend in the D&L paper. For example, it demonstrates the potential value of the LCT project and provides a useful review of scientific literature on land use change.

The long-term trends in forest area discussed by D&L are generally consistent with trends reported previously by the US Forest Service (USFS) and others, i.e., forest area in the eastern US increased substantially during the first half of the 20th century and has been relatively stable over the past 50 years. This overall regional trend is a net result of sub-regional changes in land use patterns, with forest area increasing in some states in recent decades and decreasing in others.†

Unfortunately, D&L provide only brief comments on important methodological issues that influence estimates of forest area. They report a reduction in forest area from 90.3 million ha in 1973 to 86.5 million ha in 2000. In contrast, USFS data† for forests in the region studied by D&L indicate a slight increase in forest area during the period 1977 to 1997 from 101 to 103 million ha. Factors responsible for substantial differences in forest area estimates between D&L and USFS need to be understood.

A major weakness in the D&L paper is its conflation of land use change with forest disturbance due to timber harvesting and regeneration. In their table 3, D&L attribute 3.2 million ha of “forest loss” to timber harvesting and other forms of mechanical disturbance (M-D); 1.9 million ha to development; and an additional 0.5 million ha to mining and reservoir development. D&L point out that a substantial portion of the forest they describe as “converted” by M-D is actually young, regenerating forest. This important caveat has been overlooked in much of the media coverage of the D&L paper.

An additional concern is that D&L present conflicting messages about the role of economics in land use trends. They acknowledge that economic returns to timber provide important incentives for forest stewardship on private lands. This important observation

is inconsistent with D&L's conclusion that demand for pulp and other wood products is a key regional driving force of "a transition from forest expansion to a decline in the total area of forest cover."

Significant concerns notwithstanding, the D&L paper is an important addition to the scientific literature on land use change and forest conservation. There is no question that forests in parts of the eastern US are being converted to non-forest uses at significant rates with substantial implications for water quality, biodiversity, carbon cycling, and other ecological issues. The USGS LCT project is well-positioned to make many important contributions to our understanding of trends in forest extent and condition.

†Smith, W.B., P.D. Miles, C.H. Perry and S.A. Pugh (coordinators). 2009. Forest Resources of the United States, 2007. General Technical Report WO-78. U.S. Department of Agriculture, Forest Service. Washington, DC.