LETTERS

Influences

A geographer describes an insight about permafrost and carbon sinks that came to her as she flew over Siberia to Europe. Letter writers reflect a range of opinions expressed about an article that appeared in a special issue on "Human-dominated ecosystems" (25 July). The article focused on how lost ecosystems can be restored and endangered ones conserved. And an asthma specialist offers an explanation of why asthma cases have been "increasing in Western societies" and are "most severe" among the poorest populations of the United States.

High over the Permafrost

In August, on a return flight to Europe from Novosibirsk in Central Siberia, I observed an interesting phenomenon possibly adding a further dimension to the recent discussions about carbon sinks in your pages (Research News, 18 July, p. 315; Letters, 15 Aug., p. 883; Letters, 12 Sept., p. 1591).

We were flying over permafrost at around 35,000 feet. It was a beautiful day, with the continental anticyclone operating across the whole of Siberia. On the northern horizon there was a sheet of high cloud marking the position of the Polar Front. Below, for as far as the eye could see, pools of water and winding rivers, typical of permafrost regions, were giving off plumes of vapor that were being blown briskly downwind. Clearly, the water was warmer than the land, and evaporation was taking place followed by condensation.

If this phenomenon is a common occurrence and its frequency is increasing in line with changes in permafrost morphology in the Alps and on the Tibet Plateau over the last 15 years (*1*), there could be consequences for the vegetation (*2*) in this region of typically dry, short summers and long days. Previous work (*3*) suggests that an increase in growth would promote an increase in root structures and changes in carbon storage. A conservative rough estimate of the continental area involved could be around 8 million square kilometers.

We hear about the effects on climate of increases in methane from a melting tundra. Possibly some of this effect may be countered by an increase in carbon storage and increased cloud reflectance from the vapor plumes. A study of the meteorological data and the ecological consequences of increases in humidity and temperature in this region might provide data of interest to climate modelers.

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References

1. A. P. Gorbunov, *Permafrost Periglacl. Processes* **7**, 297 (1996).
2. R. B. Myneni *et al.*, *Nature* **386**, 698 (1997).
3. B. A. Hungate *et al.*, *ibid.* **388**, 576 (1997).

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Restoring Ecosystems

In their article, "Hopes for the future: Restoration ecology and conservation biology" (25 July, p. 515), Andy P. Dobson, A. D. Bradshaw, and A. J. M. Baker write optimistically about the prospects for ecological restoration of ecosystems damaged by conversion to human use. However, because they consider only direct conversion as a source of damage, their outlook appears overly positive. When other sources of human damage to natural ecosystems are considered, particularly the introduction and spread of nonnative species, the prospects for ecological restoration look considerably more remote.

Humans, both intentionally and inadvertently, have introduced a wide variety of species to ecosystems in which they were not originally found. Many of the species are aggressive colonizers, particularly, although not exclusively, of disturbed land; some, such as *Melaleuca quinquenervia* in southern Florida, form near monocultures that appear resistant to succession by native species. The widespread presence of these species may place severe constraints on our ability to effect meaningful restoration, because they become established in place of