

On creation and  
change

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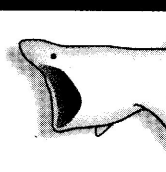
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## LETTERS

edited by Jennifer Sills

### Sustainable Forestry: Easier Said Than Done

IT IS COMMONLY HELD THAT PLANTING FORESTS HELPS TO MITIGATE CLIMATE CHANGE, because forests sequester carbon dioxide into long-lived biomass and soils (1). However, our personal experience shows that managed forests are unlikely to increase the land carbon sink unless foresters are paid a fair price for the ecosystem services they provide.

Six years ago, we bought 200 ha of mountain spruce forest and 35 ha of deciduous forest from the German government, under the condition that we would use the forest to grow and sell wood in a sustainable manner and that we would employ local labor. The spruce forest was a monoculture; the deciduous forest contained a rich flora of about 15 tree species.

The first obstacle we ran into was deer. To convert the spruce forest from a monoculture to a mixed forest, we supported the early successional rowan trees, but the deer ate the rowan tree bark. The resulting wood rot caused the trees to break. At that point, we had to choose between returning to a less environmentally friendly spruce monoculture or upsetting the public by clearing, replanting, and fencing in our mixed forest to keep out the deer. Fencing is unpopular with the German public, who are entitled to use private forest for recreation.

Clearing requires permission by German forest law; permits are granted after wind or pest damage. We opted for clearcutting in a few cases, but found that the more environmentally friendly approach of doing so prevented recovery of the forest. Leaving slash on site was well received by nature conservationists because of the habitats provided by the dead wood, but the spruce slash stimulated nitrification, and tall thickets of nettle prevented tree regeneration. When slash was removed and sold to a power station, the cost of collecting the slash was as high as the income received. Our action also upset the nature conservationists. However, the forest did regenerate.

An attempt to return to a more natural vegetation at a mountain site also met with a mixed response from conservationists. When wind damage forced us to clearcut an old spruce stand, we planted a mix of beech, sycamore, and fir. Landscape conservationists (who want to preserve the original spruce) complained that we had changed the appearance of the mountain, whereas nature conservationists applauded the fact that the new habitat supports rare insects, bats, and birds. Yet, sycamore and fir are susceptible to deer browsing and must be fenced for about 50 years. Given the carbon cost of fencing and the soil carbon loss after clearing, the climate mitigation potential of this clearcut will likely be negative over the next 60 years (1).

We also found that selling our wood was not as easy as we had envisioned. A 150-year beech could not pass through the saw mill and was not perfect for veneers; it went as cheap firewood. The price for spruce peaks at a breast-height diameter of 20 to 25 cm (typical of a 60-year-old tree) because modern construction beams are glued compound woods, not solid cuts from big trees. The forest carbon pool will fall in response to this demand for small trees. Such trees can be logged selectively with modern harvesting machines, but the machines require a 4-m-wide skidder trail every 20 m; the resulting 20% loss of forested land diminishes the capacity of the forest to absorb carbon.

Furthermore, maintaining biodiversity turns out to be a commercially risky management strategy. Industry demands uniform pieces of wood of the same species, mainly beech or spruce. The only way to maintain our 15-species mix is to sell to the niche market for high-quality stems of rare woods.

These observations show that in Germany, and likely elsewhere, there is little incentive to manage land in a climate-friendly manner. Only when ecosystem services such as mitigating climate, biodiversity, and recreation create income will they be able to compete with the market for wood as timber, pulp, or an energy source.

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#### References and Notes

1. A. Thuille, E. D. Schulze, *Glob. Change Biol.* **12**, 325 (2006).
2. We thank J. Gash for editorial help and discussion.

### Responsible Researchers Required

THE NEWS OF THE WEEK STORY "A DARK TALE behind two retractions" (R. F. Service, 18 December 2009, p. 1610) omitted important issues regarding the training of young scientists. Students and postdocs involved in this debacle may have learned excellent experimental protocols and techniques, but did any of them have training in responsible conduct of research? And if so, how did that training influence their actions? When co-workers present research results, we trust them to be open, honest, and forthright. The high stakes of losing two papers in top-tier journals for all involved, including a pretenure faculty member whose tenure decision may have been affected by the retractions, remind us that we should pursue science for the sake of discovery and self-actualization rather than less savory goals such as power, financial gain, and prestige.

Disappointingly, the News story did not discuss subsequent action that could preclude this type of situation from arising again. Challenging results that cannot be reproduced requires substantial courage. At what point do we draw the line between results that "have