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Quétier, Fabien, Sandra Lavorel, Wilfried Thuiller, and Ian Davies. 2007. PLANT-TRAIT-BASED MODELING ASSESSMENT OF ECOSYSTEM-SERVICE SENSITIVITY TO LAND-USE CHANGE. *Ecological Applications* 17:2377–2386. <http://dx.doi.org/10.1890/06-0750.1>

Articles

### PLANT-TRAIT-BASED MODELING ASSESSMENT OF ECOSYSTEM-SERVICE SENSITIVITY TO LAND-USE CHANGE

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Evidence is accumulating that the continued provision of essential ecosystem services is vulnerable to land-use change. Yet, we lack a strong scientific basis for this vulnerability as the processes that drive ecosystem-service delivery often remain unclear. In this paper, we use plant traits to assess ecosystem-service sensitivity to land-use change in subalpine grasslands. We use a trait-based plant classification (plant functional types, PFTs) in a landscape modeling platform to model community dynamics under contrasting but internally consistent land-use change scenarios. We then use predictive models of relevant ecosystem attributes, based on quantitative plant traits, to make projections of ecosystem-service delivery. We show that plant traits and PFTs are effective predictors of relevant ecosystem attributes for a range of ecosystem services including provisioning (fodder), cultural (land stewardship), regulating (landslide and avalanche risk), and supporting services (plant diversity). By analyzing the relative effects of the physical environment and land use on relevant ecosystem attributes, we also show that these ecosystem services are most sensitive to changes in grassland management, supporting current agri-environmental policies aimed at maintaining mowing of subalpine grasslands in Europe.

Keywords: [central French Alps](#), [climate change](#), [ecosystem management](#), [LAMOS \(landscape modeling shell\)](#), [land-use change scenarios](#), [leaf-height-seed plant strategy scheme \(LHS\)](#), [subalpine grasslands](#)

Received: May 5, 2006; Revised: December 18, 2006; Accepted: March 29, 2007; Revised: May 7, 2007

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