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Invasive species, management for conservation and remote sensing

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Editors' Award for 2007

The paper chosen for the award by the Chief Editors of *Applied Vegetation Science*, from among those published in 2007 is that by Hartman & McCarthy (2007).

Exotic (alien, non-indigenous) species are a concern for their impact on native communities, as well as fascinating probes into community structure: natural experiments. Recent research has tried to measure their impact by examining invaded and non-invaded sites. This approach has the flaw that the non-invaded sites may not have been invaded because they were different in the first place. Examining sites before and after an invasion is difficult because invasions are not normally noticed until after they have happened, and anyway there might have been an allogenic environmental change, or one caused by the reaction of the other species. The ideal would be to go backwards in time in both invaded and non-invaded sites. Impossible? But Hartman & McCarthy (2007) did this by dendrochronology. Working in deciduous hardwood forest in Ohio, USA, they shewed that the exotic understorey shrub *Lonicera maackii* (Rupr.) Herder reduced the growth of native trees in the overstorey.

Covers and conservation

We are delighted with the photographic covers that our publishers are now able to give each issue. They are chosen mainly for the help they give to the reader in understanding one of the papers in the issue, though we like pretty pictures as much as anyone.

The cover of the April issue shewed fruit of the shrub *Hippophae rhamnoides* L., which has been invading coastal dunes in northwestern Europe. A study of this species by Isermann et al. (2007) indicated the need for management intervention. Fire was illustrated on the August cover, to illustrate the study of Seefeldt et al. (2007) into its use in vegetation management. Prescribed fire is a vital tool for the management of natural communities in many parts of the world but a very sensitive politicial issue, so ecologists need to have firm information on its effect to advocate its use. The December issue gave a rabbit's-eye view of a species-rich fen meadow, one that was used as a donor site for hay to seed the restoration of a re-wetted fen (Rasan et al. 2007). Thus, these three covers illustrate problems of management and restoration. Another study of management for restoration is that of Critchley et al. (2007) on hay meadows in an 'Environmentally Sensitive Area' (ESA) in northern England. Permanent quadrats had been set up in 1987, and they re-recorded them in 2002. The species-rich grassland there had declined in the forb richness, in spite of the ESA-imposed management restrictions that were designed to prevent this. Over all the sites, differences in management had only minor effects on conservation value in terms of species composition, but the recommended absence of spring grazing, absence of cattle grazing, late hay cutting and maintenance of low soil fertility all promoted forb richness as intended. Effective restoration and conservation requires such monitoring of progress.

The journal's scope includes management for the conservation of threatened species, so long as this is seen within a community context. For example, Rautiainen et al. (2007) discuss the difficult problem of three threatened early-successional species, which depend for their continued existence on the maintenance of disturbed areas. The authors experimented with mowing, shrub removal and soil perturbation as types of disturbance. Such treatments increased the abundance of two of the species, but not that of a *Puccinellia* Parl. species. They suggested that whilst such management tools would have conservation value, these early-successional species really need open habitats, and should be conserved in the landscape by being transplanted to new, bare islets beyond the range of their unaided dispersal ability.

Virtually any management or restoration scheme in a terrestrial ecosystem needs a vegetation target, but it is often difficult to know what this should be. Both the *Journal of Vegetation Science* and *Applied Vegetation Science* are interested in palaeoecology. Behling et al. (2007) used radiocarbon dating and palynology to determine the history of a grassland/forest mosaic in Brazil, which could be used to set management objectives for conservation. They concluded that the mosaic was natural, having existed for over 1200 years. The grasslands were caused by fire, perhaps natural and perhaps originally set by Amerindians, rather

than being caused by the clearance of forests by European settlers as some had supposed. Currently, fire is being suppressed and the grasslands are being invaded by woody species. Management for conservation therefore means a 'let burn' policy, very controversial as in most parts of the world, or an alternative management to suppress woody species, such as restoring cattle grazing. In the past three years there have been seven issues of *Applied Vegetation Science*. The cover pictures on three have featured fire. This is not just because fire is photogenic; it reflects that fire management constitutes a huge gap between on the one hand sound management for both conservation and safety as known by vegetation scientists and on the other hand the perception of fire by the public and politicians as an unmitigated disaster. Perhaps that gap is narrowest for the *Pinus palustris* P. Mill. (longleaf pine) forests of south-eastern USA, but even there it is a continuing problem.

Remote sensing

Applied Vegetation Science has a particular interest in application of remote sensing, so long as the research is directed at a question that will be of wide interest: because of the area covered, the application or the technique. Rocchini et al. (2007) used remote sensing to estimate plant species richness. They found that near infrared was vital for this purpose, and proposed a new way to use this wavelength range, i.e. for biodiversity estimates, that adds to its traditional use in estimating biomass or vegetation structure. Together with a small contribution from visible wavelengths they could predict half of the variation in species richness ($R^2 = 0.48$).

Other papers published in *Applied Vegetation Science* during 2007 that have considered the application of remote sensing techniques include the use of LIDAR data to characterise diverse plant communities in Aspen parkland rangeland, Canada, (Su & Bork 2007) and the use of Thematic Mapper (TM) Imagery to validate a successional transition from pinewood to hardwood in North Carolina that was previously inferred from plot data (McDonald et al. 2007).

Publishing developments

Applied Vegetation Science and our sister journal the *Journal of Vegetation Science* are the official publications owned by the International Association for Vegetation Science. There have been some publication changes for these journals, and we are very grateful to our publishers, Opulus Press, for implementing these.

- There is now an online system for manuscript submission and handling. This has been very well received by authors, as well as by editors and referees.
- A 'First Online' system allows online access to manuscripts that are waiting to be published. They will not have page numbers, but they can be cited through their DOI (Digital Object Identifier) number, which will remain with them permanently.
- Opulus Open Access is a system whereby an author pays a fee to allow free online access for all readers. Such papers will be peer-refereed and edited exactly as other papers, and the co-ordinating editor will not be informed of any expressed intent to purchase open access. It is well documented that open-access papers receive significantly more citations, so there is considerable incentive to pay the fee. IAVS members will receive a 20% discount. For further details see www.opuluspress.se. Open Access will continue to be automatic and free for Editorials, Invited Perspectives, Forum papers, Introductions to Special Features, and Book reviews.
- In 2007, three issues of *Applied Vegetation Science* were published for the first time. If the number of submitted manuscripts continues to grow the publishers envisage the possibility of four issues per year quite soon.

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