



Ecosphere Ecology Ecological Monographs Ecological Applications Frontiers Bulletin Ecological Archives

ESA Publications Home Online Journals Home EcoTrack Subscriptions

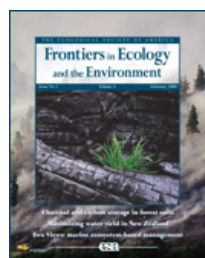
Quick Search

All Publications > Frontiers in Ecology and the Environment > February 2008 > Maximizing water yield with indigenous non-forest vegetation: a New Ze...

Advanced Search

Volume 6, Issue 1 (February)

< Previous Next >



[Current Issue](#)
[Available Issues](#)
[e-View](#)

Share this Article

[Share](#) |

Journal Information

ISSN: 1540-9295
Frequency: 10 times per year

[General Information](#)

[Staff](#)

[Instructions to Authors](#)

[Manuscript Submission](#)

[How to Subscribe](#)

[Permissions](#)

< [Previous Article](#)

Volume 6, Issue 1 (February 2008)

[Next Article](#) >

[Add to Favorites](#)

| [Email](#)

| [Download to Citation Manager](#)

| [Track Citations](#)

| [Permissions](#)

[Full-text](#)

[PDF](#)

Alan F Mark, and Katharine JM Dickinson. 2008. Maximizing water yield with indigenous non-forest vegetation: a New Zealand perspective. *Frontiers in Ecology and the Environment* 6: 25–34. <http://dx.doi.org/10.1890/060130>

Reviews

Maximizing water yield with indigenous non-forest vegetation: a New Zealand perspective

Alan F Mark* and Katharine JM Dickinson

Provision of clean freshwater is an essential ecosystem service that is under increasing pressure worldwide from a variety of conflicting demands. Water yields differ in relation to land-cover type. Successful resource management therefore requires accurate information on yields from alternative vegetation types to adequately address concerns regarding water production. Of particular importance are upper watersheds/catchments, regardless of where water is extracted. Research in New Zealand has shown that, when in good condition, indigenous tall tussock grasslands can maximize water yield relative to other vegetation cover types. A long-term hydrological paired-catchment study revealed reductions (up to 41% after 22 years) in water yielded annually from an afforested catchment relative to adjacent indigenous grassland. Furthermore, a stable isotope assessment showed that water from fog may substantially contribute to yield in upland tussock grasslands. The tall tussock life-form and its leaf anatomy and physiology, which minimize transpiration loss, appear to be the differentiating factors. Thus, maintaining dominance of such cover is important for water production, especially in upland catchments. Ecological analogues and integrated land-use planning are discussed in the context of this essential ecosystem service. Water management programs in other countries are reviewed and that of South Africa is commended as a model.

Department of Botany, University of Otago, Dunedin, New Zealand

*amark@otago.ac.nz

Cited by

David A. Norton, Adam Forbes. (2013) Can exotic pine trees assist in restoration?. *Applied Vegetation Science* 16:2, 169-170
Online publication date: 1-Apr-2013.

[CrossRef](#)

Octavio Pérez-Maqueo, M. Luisa Martínez, Gabriela Vázquez, Miguel Equihua. (2013) Using Four Capitals to Assess Watershed Sustainability. *Environmental Management* 51:3, 679-693

Online publication date: 1-Mar-2013.

[CrossRef](#)

M.A. Davis. 2013. Invasive Plants and Animal Species. , 51-59.

[CrossRef](#)

William G. Kepner, Molly M. Ramsey, Elizabeth S. Brown, Meghann E. Jarchow, Katharine J. M. Dickinson, Alan F. Mark. (2012) Hydrologic futures: using scenario analysis to evaluate impacts of forecasted land use change on hydrologic services. *Ecosphere* 3:7, art69

Online publication date: 1-Jul-2012.

[Abstract](#) · [Full Text](#) · [PDF \(11192 KB\)](#)

Valerie T. Eviner, Kelly Garbach, Jill H. Baty, Sarah A. Hoskinson. (2012) Measuring the Effects of Invasive Plants on Ecosystem Services: Challenges and Prospects. *Invasive Plant Science and Management* 5:1, 125-136

Online publication date: 1-Jan-2012.

[CrossRef](#)

Brian W. van Wilgen, Ahmed Khan, Christo Marais. 2010. Changing Perspectives on Managing Biological Invasions: Insights from South Africa and the Working for Water programme. , 377-393.

[CrossRef](#)

ALAN F. MARK, PETER A. WHIGHAM. (2010) Disturbance-induced changes in a high-alpine cushionfield community, south-central New Zealand. *Austral Ecology* no

Online publication date: 1-Oct-2010.

[CrossRef](#)

NICOLA J. DAY, HANNAH L. BUCKLEY. (2010) Invasion patterns across multiple scales by Hieracium species over 25 years in tussock grasslands of New Zealand's South Island. *Austral Ecology* no

Online publication date: 1-Oct-2010.

[CrossRef](#)

Anibal Pauchard, Christoph Kueffer, Hansjörg Dietz, Curtis C Daehler, Jake Alexander, Peter J Edwards, José Ramón Arévalo, Lohengrin A Cavieres, Antoine Guisan, Sylvia Haider, Gabi Jakobs, Keith McDougall, Constance I Millar, Bridgett J Naylor, Catherine G

Parks, Lisa J Rew, Tim Seipel. (2009) Ain't no mountain high enough: plant invasions reaching new elevations. *Frontiers in Ecology and the Environment* 7:9, 479-486

Online publication date: 1-Nov-2009.

[Abstract](#) · [Full Text](#) · [PDF \(903 KB\)](#)

Alan Mark, Pascale Michel, Katharine Dickinson, Bruce McLennan. (2009) The conservation (protected area) status of New Zealand's indigenous grasslands: An update. *New Zealand Journal of Botany* 47:1, 53-60

Online publication date: 1-Mar-2009.

[CrossRef](#)

Kathleen A. Farley, Gervasio Piñeiro, Sheila M. Palmer, Esteban G. Jobbágy, Robert B. Jackson. (2008) Stream acidification and base cation losses with grassland afforestation. *Water Resources Research* 44,

Online publication date: 1-Jan-2008.

[CrossRef](#)

ESA Publications Office | 127 W. State Street | Suite 301 | Ithaca, NY 14850-5427 | phone 607-255-3221 | email esa_journals@cornell.edu

Frontiers Editorial Office | 1990 M Street, NW | Suite 700 | Washington, DC 20036 | phone 202-833-8773 | email frontiers@esa.org

ESA Headquarters | 1990 M Street, NW | Suite 700 | Washington, DC 20036 | phone 202-833-8773 | email esahq@esa.org

Copyright Ecological Society of America. All rights reserved.

