

Landscape Ecology - A Science at Technology's Whim?

Is technology simply a tool to allow us to relate process to pattern or does the use of technology drive the science of landscape ecology? In this edition of IALE(UK) News we present the results of an analysis of numbers of citations of papers published in the journal *Landscape Ecology*. The results of this survey are illuminating.

The survey attempts to assess the impact of papers in terms of *absolute* and *relative* numbers of citations of all papers published in the journal *Landscape Ecology* since its inception in 1987. For the former it is obvious that age is a significant factor. The earlier a paper was published, the more likely it is to have been cited. This list is dominated by papers from USA, again, not surprising since there are more researchers in the USA. The second analysis aims to factor out the influence of age. What do the results of this analysis tell us?

First, age remains a significant factor; papers published early on remain high in the list of the relative scores. This could be because when it was first published *Landscape Ecology* was one of the few vehicles for research into landscape ecology. Accordingly, papers published early on had a relatively greater impact. However, landscape ecology is now becoming part of the mainstream and papers are now accepted by a wide variety of journals.

Second, the subject matter shows a healthy spread of papers dealing with both pattern and process. Pattern papers use GIS and indices and mention terms such as contagion, lacunarity and fractals. As such, they talk about landscape metrics, gap analysis, spatial organisation, landscape pattern and scale. Papers dealing with process not only deal with general principles but also concepts such as animal movement, corridors, edges, metapopulations, thresholds and landscape equilibrium. The highest scoring papers focus very much on what happens to individuals, populations and, in particular, on animals. Community-level analyses and other taxa such as plants are not so popular.

These results tell us that we are dealing with a healthy, maturing science. It is a science that is not only concerned with measuring patterns in landscape over a variety of spatial and temporal scales but which is also concerned with trying to understand the consequences of those patterns on biota.

Yes, there are some highly cited papers that seem to concentrate solely on using technology to produce measures of pattern perhaps without relating this to process. But, is landscape ecology a science at technology's whim - well, what do you think?

Duncan McCollin

Julian Bayliss writes.....

Dear IALE-UK members,

Greetings from Africa!! Having been involved with IALE-UK over the last 5 years, I now find myself active with AFRICA-IALE. This chapter of IALE was only established towards the end of last year and has enormous potential.

Rich in diversity of landscape characteristics, and operating up to a continental scale, every facet of landscape ecology is encountered in Africa. Next July sees the maiden conference of AFRICA-IALE in Ghana (July 19-23, Elmina, 2005) entitled 'Changing Landscapes of Africa: A Common Approach to Diverse Challenges' (<http://www.calmit.unl./africa-iale>) and we are looking for support and involvement. I would therefore encourage any IALE-UK members with an interest in African ecology to join the chapter and support the conference.

I am currently in Malawi, a country I first visited 15 years ago, where I am working for the Wildlife Conservation Society and the Mulanje Mountain Conservation Trust. My role is to co-ordinate biodiversity surveys of the mountain with a view to setting up an ecological monitoring programme. Hope alls well and many thanks,

Julian Bayliss (PhD)

Director

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Student Conference Travel Award

The IALE(UK) awards a number of travel grants to students studying landscape ecology at a UK university. The award is open to all students with an interest in landscape ecology who are attending a taught course at Masters level or who are undertaking a degree by research. In general, awards are designed to assist postgraduate students to attend the annual conference of IALE(UK) and for research postgraduates to attend other meetings, including the European and International Meetings of the IALE.

Please apply to:

Dr G.H. Griffiths, Secretary IALE(UK)

Department of Geography

Whiteknights

Reading, RG6 6AB

Email: g.h.griffiths@reading.ac.uk

Annual General Meeting

The Annual General Meeting of IALE (UK) will be held at the conference in Cirencester, 'Landscape Ecology of Trees and Forests', on **Wednesday June 23rd at 5.30pm**. All members of IALE (UK) are encouraged to attend. Both the Chair and the Treasurer have indicated their wish to stand down this year. A nomination for the selection of candidates to serve on the IALE(UK) Committee is included at the bottom of this Newsletter.

Please complete this form and return to The Secretary, Geoffrey Griffiths, as soon as possible or bring the completed form to the Annual Conference. Please forward your suggestion regardless of whether you have a Secunder because the Committee may be able to support your nomination.

Email nominations are also acceptable: g.h.griffiths@reading.ac.uk

Top 21 Cited Papers in Landscape Ecology

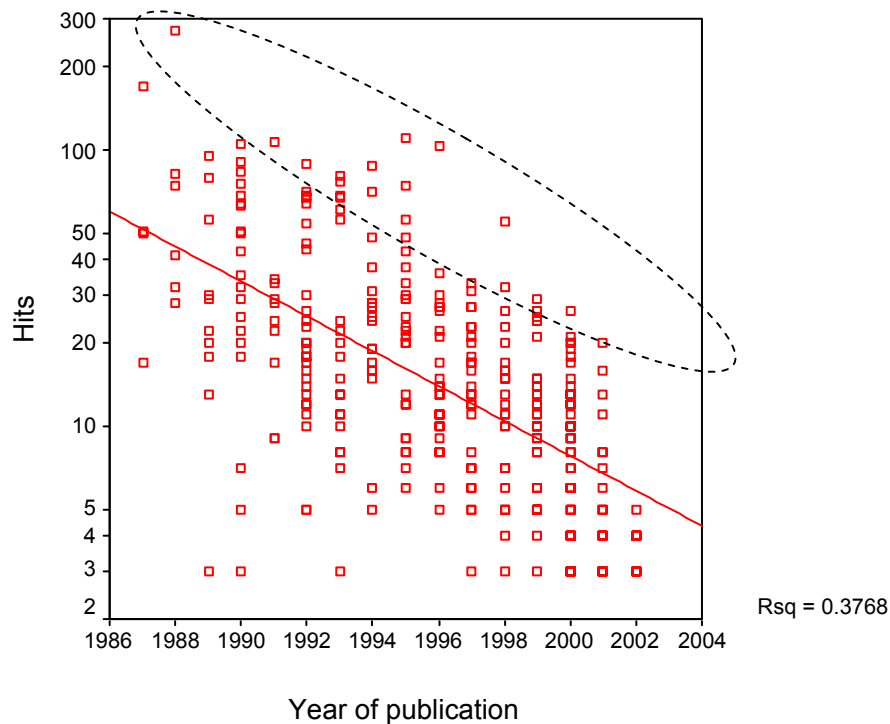
The table below was put together using Web of Science and is the absolute number of citations (as at May 24, 2004) for papers published in the journal Landscape Ecology since its inception in 1987. Way out in front is O'Neill et al.'s paper featured in the first volume dealing with indices of landscape pattern. Other papers dealing with measuring landscape pattern similarly score highly. O'Neill's name also appears elsewhere in this table showing how influential his work has been. Another name that is featured highly is Monica Turner's. The theme of Monica's work is landscape pattern and process and of course she had another very influential paper published on that very topic in Annual Review of Ecology and Systematics in 1989. Along with Robert Gardner, it should be noted that Robert O'Neill and Monica Turner are also co-authors of a standard college text: Pattern and process: landscape ecology in theory and practice.

As mentioned in the Editorial above, the list is dominated by Americans. This is not surprising since there are more landscape ecologists in the USA compared to anywhere else. (It might be instructive to repeat the analysis controlling by numbers of IALE members in each country).

Top 21 Absolute Cited Papers in Landscape Ecology as of May 24, 2004 (Top 10 in Relative table given in parentheses)

Hits	Author(s)	Title	Year	Vol	Page nos
272	O'Neill <i>et al.</i> (3)	Indices of landscape pattern	1988	1	153-162
172	Gardnr <i>et al.</i> (12)	Neutral models for the analysis of broad-scale landscape pattern	1987	1	19-28
110	Riitters <i>et al.</i> (2)	A factor analysis of landscape pattern and structure metrics	1995	10	23-39
108	Opdam (8)	Metapopulation theory and habitat fragmentation: a review of holarctic breeding bird studies	1991	5	93-106
106	Andow <i>et al.</i> (15)	Spread of invading organisms	1990	4	177-188
103	Roth <i>et al.</i> (1)	Landscape influences on stream biotic integrity assessed at multiple spatial scales	1996	11	141-156
95	O'Neill <i>et al.</i>	A hierarchical framework for the analysis of scale	1989	3	193-205
91	Pielke & Avissar	Influence of landscape structure on local and regional climate	1990	4	133-155
90	Gustafson & Parker (9)	Relationships between landcover proportion and indexes of landscape spatial pattern	1992	7	101-110
88	Turner & Romme (4)	Landscape dynamics in crown fire ecosystems	1994	9	59-77
83	Turner	Spatial and temporal analysis of landscape patterns	1990	4	21-30
82	Turner & Ruscher	Changes in landscape patterns in Georgia, USA	1998	1	241-251
81	Turner <i>et al.</i> (7)	A revised concept of landscape equilibrium - disturbance and stability on scaled landscapes	1993	8	213-227
80	Baker	A review of models of landscape change	1989	2	111-133
77	Pearson (10)	The spatial extent and relative influence of landscape-level factors on wintering bird populations	1993	8	3-18
76	Bennett	Habitat corridors and the conservation of small mammals in a fragmented forest environment	1990	4	109-122
75	Ludwig & Tongway (5)	Spatial organization of landscapes and its function in semiarid woodlands, Australia	1995	10	51-63
74	O'Neill <i>et al.</i>	Resource utilization scales and landscape pattern	1988	2	63-69
71	With (6)	Using fractal analysis to assess how species perceive landscape structure	1994	9	25-36
71	Johnson <i>et al.</i>	Animal movements and population-dynamics in heterogeneous landscapes	1992	7	63-75
69	Merriam & Lanoue	Corridor use by small mammals: field measurement for three experimental types of <i>Peromyscus leucopus</i>	1990	4	123-131

The relationship between number of citations and year of publication. Since absolute numbers of citations is related to year of publication, age can be factored out by using the residuals in a regression of hits versus age. The dashed ellipse on the figure below indicates the highest scoring residuals - these are the papers we are interested in.



The following table gives the relative number of citations of papers in Landscape Ecology after factoring out age. The list does not include any of the papers in the above table, instead the figure in brackets in the first column above gives the position of the top 10. There is not much difference between the residuals of the top 5 or so and all feature in the table above.

In this analysis, papers concerned with generating indices of landscape pattern remain a popular subject area of study (e.g. Hargis et al., 1998; Li & Reynolds, 1993) but it is gratifying to note that some of the papers doing well in this table link pattern to process more explicitly than earlier papers. For example, With & King's paper links dispersal success to lacunarity thresholds.

A couple of up-and-coming recent papers that feature highly are Jennings (2000) on gap analysis and Tischendorf (2001) which asks whether landscape indices can predict ecological processes consistently. OK, so this is only one journal. The analysis could easily be extended across a range of journals but I suspect the themes will remain the same. Landscape ecology is about pattern and process: there are those who are concerned with landscape pattern; those who are concerned with process; and those who try to put the two together.

Top 21 Relative Cited Papers in Landscape Ecology as of May 24, 2004 (not including those indicate in table above)

Hits	Author(s)	Title	Year	Vol	Page nos
55	Hargis <i>et al.</i>	The behavior of landscape metrics commonly used in the study of habitat fragmentation	1998	13	167-186
56	Forman	Some general-principles of landscape and regional ecology	1995	10	133-142
26	Jennings	Gap analysis: concepts, methods, and recent results	2000	15	5-20
29	With & King	Dispersal success on fractal land-scapes: a consequence of lacunarity thresholds	1999	14	73-82
68	Li <i>et al.</i>	Developing alternative forest cutting patterns - a simulation approach	1993	8	63-75
67	Li & Reynolds	A new contagion index to quantify spatial patterns of landscapes	1993	8	155-162
32	Gibbs	Distribution of woodland amphibians along a forest fragmentation gradient	1998	13	263-268
48	Baker	Long-term response of disturbance landscapes to human intervention and global change	1995	10	143-159
20	Tischendorf	Can landscape indices predict ecological processes consistently?	2001	16	235-254
26	Lidicker	Responses of mammals to habitat edges: an overview	1999	14	333-343
26	Brown <i>et al.</i>	Long-term, landscape patterns of past fire events in a montane ponderosa pine forest of central Colorado	1999	14	513-532
71	Johnson <i>et al.</i>	Animal movements and population-dynamics in heterogeneous landscapes	1992	7	63-75
61	Plotnick <i>et al.</i>	Lacunarity indexes as measures of landscape texture	1993	8	201-211
25	Pan <i>et al.</i>	Temporal (1958-1993) and spatial patterns of land use changes in Haut-Saint-Laurent (Quebec, Canada) and their relation to landscape physical attributes	1999	14	35-52
33	Miller <i>et al.</i>	Effects of landscape patterns on biotic communities	1997	12	137-153
68	Baker & Cai	The r.le programs for multiscale analysis of landscape structure using the GRASS geographical information system	1992	7	291-302
21	Wagner <i>et al.</i>	Additive partitioning of plant species diversity in an agricultural mosaic landscape	2000	15	219-227
67	Hansen & Urban.	Avian response to landscape pattern - the role of species life histories	1992	7	163-180
43	Enoksson <i>et al.</i>	Deciduous forest and resident birds - the problem of fragmentation within a coniferous forest landscape	1995	10	267-275
24	Jansson & Angelstam	Threshold levels of habitat composition for the presence of the long-tailed tit (<i>Aegithalos caudatus</i>) in a boreal landscape	1999	14	283-290
24	Bowne <i>et al.</i>	Effects of landscape spatial structure on movement patterns of the hispid cotton rat (<i>Sigmodon hispidus</i>)	1999	14	53-65

Recent Contents

Landscape Ecology

Volume 19, Issue 2

Haynes KJ, Cronin JT (2004) Confounding of patch quality and matrix effects in herbivore movement studies. pp. 119-124

Wu JG (2004) Effects of changing scale on landscape pattern analysis: scaling relations pp. 125-138

Wells ML, O'Leary JF, Franklin J, et al. (2004) Variations in a regional fire regime related to vegetation type in San Diego County, California (USA). pp. 139-152

Duncan BW, Schmalzer PA (2004) Anthropogenic influences on potential fire spread in a pyrogenic ecosystem of Florida, USA. pp. 153-165

Mast JN, Wolf JJ (2004) Ecotonal changes and altered tree spatial patterns in lower mixed-conifer forests, Grand Canyon National Park, Arizona, USA. pp. 167-180

Arnot C, Fisher PF, Wadsworth R, et al. (2004) Landscape metrics with ecotones: pattern under uncertainty. pp. 181-195

Saura S (2004) Effects of remote sensor spatial resolution and data aggregation on selected fragmentation indices. pp. 197-209

Waldhardt R, Simmering D, Otte A (2004) Estimation and prediction of plant species richness in a mosaic landscape. pp. 211-226

Volume 19, Issue 1

Bowne DR, Bowers MA (2004) Interpatch movements in spatially structured populations: a literature review. pp. 1-20

Brunzel S, Ellingsen H, Frankl R (2004) Distribution of the Cinnabar moth *Tyria jacobaeae* L. at landscape scale: use of linear landscape structures in egg laying on larval hostplant exposures. pp. 21-27

Helmer EH (2004) Forest conservation and land development in Puerto Rico. pp. 29-40

Chust G, Pretus JL, Ducrot D, et al. (2004) Scale dependency of insect assemblages in response to landscape pattern. pp. 41-57

Hall O, Hay GJ, Bouchard A, et al. (2004) Detecting dominant landscape objects through multiple scales: An integration of object-specific methods and watershed segmentation. pp. 59-76

Verburg PH, Veldkamp A (2004) Projecting land use transitions at forest fringes in the Philippines at two spatial scales. pp. 77-98

Millward AA, Kraft CE (2004) Physical influences of landscape on a large-extent ecological disturbance: the northeastern North American ice storm of 1998. pp. 99-111

Volume 18, Issue 8

Agee JK (2003) Historical range of variability in eastern Cascades forests, Washington, USA. pp. 725-740

Rempel RS, Kushneriuk RS (2003) The influence of sampling scheme and interpolation method on the power to detect spatial effects of forest birds in Ontario (Canada). pp. 741-757

Pfeffer K, Pebesma EJ, Burrough PA (2003) Mapping alpine vegetation using vegetation observations and topographic attributes. pp. 759-776

Brown DG (2003) Land use and forest cover on private parcels in the Upper Midwest USA, 1970 to 1990. pp. 777-790

Verbeylen G, De Bruyn L, Adriaensen F, et al. (2003) Does matrix resistance influence Red squirrel (*Sciurus vulgaris* L. 1758) distribution in an urban landscape? pp. 791-805

Volume 18, Issue 7

Silbernagel J (2003) Spatial theory in early conservation design: examples from Aldo Leopold's work. pp. 635-646

Snyder CD, Young JA, Villeda R, et al. (2003) Influences of upland and riparian land use patterns on stream biotic integrity. pp. 647-664

Mouillot F, Ratte JP, Joffre R, et al. (2003) Some determinants of the spatio-temporal fire cycle in a mediterranean landscape (Corsica, France). pp. 665-674

Fleishman E, Betrus CJ, Blair RB (2003) Effects of spatial scale and taxonomic group on partitioning of butterfly and bird diversity in the Great Basin, USA. pp. 675-685

Goodwin BJ (2003) Is landscape connectivity a dependent or independent variable? pp. 687-699

Smithwick EAH, Harmon ME, Domingo JB (2003) Modeling multiscale effects of light limitations and edge-induced mortality on carbon stores in forest landscapes. pp. 701-721

Volume 18, Issue 6

Chardon JP, Adriaensen F, Matthysen E (2003) Incorporating landscape elements into a connectivity measure: a case study for the Speckled wood butterfly (*Pararge aegeria* L.). pp. 561-573

Jobin B, Beaulieu J, Grenier M, et al. (2003) Landscape changes and ecological studies in agricultural regions, Quebec, Canada. pp. 575-590

Kaye MW, Stohlgren TJ, Binkley D (2003) Aspen structure and variability in Rocky Mountain National Park, Colorado, USA. pp. 591-603

Overgaard HJ, Ekbom B, Suwonkerd W, et al. (2003) Effect of landscape structure on anopheline mosquito density and diversity in northern Thailand: Implications for malaria transmission and control. pp. 605-619

Lovett-Doust J, Biernacki M, Page R, et al. (2003) Effects of land ownership and landscape-level factors on rare-species richness in natural areas of southern Ontario, Canada. pp. 621-633

Boutet JC, Weishampel JF (2003) Spatial pattern analysis of pre- and post-hurricane forest canopy structure in North Carolina, USA. pp. 553-559

Volume 18, Issue 5

Turner MG, Pearson SM, Bolstad P, et al. (2003) Effects of land-cover change on spatial pattern of forest communities in the Southern Appalachian Mountains (USA). pp. 449-464

Fule PZ, Crouse JE, Heinlein TA, et al. (2003) Mixed-severity fire regime in a high-elevation forest of Grand Canyon, Arizona, USA. pp. 465-485

Hooten MB, Larsen DR, Wikle CK (2003) Predicting the spatial distribution of ground flora on large domains using a hierarchical Bayesian model. pp. 487-502

Guo ZW, Xiao XM, Gan YL, et al. (2003) Landscape planning for a rural ecosystem: case study of a resettlement area for residents from land submerged by the Three Gorges Reservoir, China. pp. 503-512

Wamelink GWW, ter Braak CJF, van Dobben HF (2003) Changes in large-scale patterns of plant biodiversity predicted from environmental economic scenarios. pp. 513-527

Kurttila M, Pukkala T (2003) Combining holding-level economic goals with spatial landscape-level goals in the planning of multiple ownership forestry. pp. 529-541

Desrochers A, Hanski IK, Selonen V (2003) Siberian flying squirrel responses to high- and low-contrast forest edges. pp. 543-552

Volume 18, Issue 4

Westphal MI, Field SA, Tyre AJ, et al. (2003) Effects of landscape pattern on bird species distribution in the Mt. Lofty Ranges, South Australia. pp. 413-426

Tinker DB, Romme WH, Despain DG (2003) Historic range of variability in landscape structure in subalpine forests of the Greater Yellowstone Area, USA. pp. 427-439

Kline JD, Azuma DL, Moses A (2003) Modeling the spatially dynamic distribution of humans in the Oregon (USA) Coast Range. pp. 347-361

Wang GX, Guo XY, Shen YP, et al. (2003) Evolving landscapes in the headwaters area of the Yellow River (China) and their ecological implications. pp. 363-375

Brotons L, Monkkonen M, Huhta E, et al. (2003) Effects of landscape structure and forest reserve location on old-growth forest bird species in Northern Finland. pp. 377-393

Chen SS, Jim CY (2003) Quantitative assessment of the treescape and cityscape of Nanjing, China. pp. 395-412

Landscape & Urban Planning

Nikolakaki P (2004) A GIS site-selection process for habitat creation: estimating connectivity of habitat patches 68 (1): 77-94

Fabos JG, Ryan RL (2004) International greenway planning: an introduction. 68 (2-3): 143-146

Jongman RHG, Kulvik M, Kristiansen I (2004) European ecological networks and greenways. 68 (2-3): 305-319

Mander U, Palang H (2004) Development of European landscapes. 67 (1-4): 1-8

Antrop M (2004) Landscape change and the urbanization process in Europe. 67 (1-4): 9-26

Vogt J, Puumalainen J, Kennedy P, et al. Integrating information on river networks, catchments and major forest types: towards the characterisation and analysis of European landscapes. 67 (1-4): 27-41

Weiers S, Bock M, Wissen M, et al. (2004) Mapping and indicator approaches for the assessment of habitats at different scales using remote sensing and GIS methods. 67 (1-4): 43-65

Sickel H, Ihse M, Norderhaug A, et al. (2004) How to monitor semi-natural key habitats in relation to grazing preferences of cattle in mountain summer farming areas - An aerial photo and GPS method study. 67 (1-4): 67-77

Zebisch M, Wechsung F, Kenneweg H (2004) Landscape response functions for biodiversity - assessing the impact of land-use changes at the county level. 67 (1-4): 157-172

Burel F, Butet A, Delettre YR, et al. (2004) Differential response of selected taxa to landscape context and agricultural intensification. 67 (1-4): 195-204

Arheimer B, Torstensson G, Wittgren HB (2004) Landscape planning to reduce coastal eutrophication: agricultural practices and constructed wetlands. 67 (1-4): 205-215

Ryan RL (2003) Human ecology: Following nature's lead. 66 (1): 57-59

Mayer AL, Cameron GN (2003) Consideration of grain and extent in landscape studies of terrestrial vertebrate ecology. 65 (4): 201-217

van Kamp I, Leidelmeijer K, Marsman G, et al. (2003) Urban environmental quality and human well-being - Towards a conceptual framework and demarcation of concepts; a literature study. 65 (1-2): 7-20

Rubino MJ, Hess GR (2003) Planning open spaces for wildlife 2: modeling and verifying focal species habitat. 64 (1-2): 89-104

Bogaert J (2003) Vegetation mapping - From patch to planet. 64 (1-2): 115-117

Honnay O, Piessens K, Van Landuyt W, et al. (2003) Satellite based land use and landscape complexity indices as predictors for regional plant species diversity. 63 (4): 241-250

de Groot WT, van den Born RJG (2003) Visions of nature and landscape type preferences: an exploration in The Netherlands. 63 (3): 127-138

Akbar KF, Hale WHG, Headley AD (2003) Assessment of scenic beauty of the roadside vegetation in northern England. 63 (3): 139-144

Potschin MB, Haines-Young RH (2003) Improving the quality of environmental assessments using the concept of natural capital: a case study from southern Germany. 63 (2): 93-108

Sutcliffe OL, Bakkestuen V, Fry G, et al. (2003) Modelling the benefits of farmland restoration: methodology and application to butterfly movement. 63 (1): 15-31

Tulloch DL, Myers JR, Hasse JE, et al. (2003) Integrating GIS into farmland preservation policy and decision making. 63 (1): 33-48

Lindenmayer DB, Fischer J (2003) Sound science or social hook - a response to Brooker's application of the focal species approach. 62 (3): 149-158

Ricotta C, Corona P, Marchetti M (2003) Beware of contagion! 62 (3): 173-177

Diary

IALE Meetings:

- 2005 Landscape Ecology - New Directions. Annual Conference of IALE (UK), September
- 2005 European IALE Congress, Portugal Landscape Ecology in the Mediterranean: Inside and outside approaches. See <http://www.apep.pt/>
- 2005 Africa Chapter of International Association of Landscape Ecology (Africa-IALE) 1st Regional Biannual Conference. Elmina, Ghana (19 - 23 July 2005). Changing Landscapes of Africa: A Common Approach to Diverse Challenges
- 2006 Water in the Landscape. Annual Conference of IALE (UK), September
- 2007 World Congress, Wageningen, The Netherlands

See <http://www.landscape-ecology.org/events/regional.htm> for diary of future IALE events.

Other Meetings of Interest:

- 2004 Eco-complexity and dynamics of the cultural landscape. The 34th Annual Conference of the Ecological Society (*Gesellschaft für Oekologie, GfOE*). 13 - 17 September 2004, Giessen, Germany. <http://www.uni-giessen.de/gfoe2004/>
- 2004 BES Annual Meeting 7-9 September, Lancaster University. Has Session Topics on Landscape Ecology and Habitat Fragmentation.
- 2005 EurEco 2005 'Ecology without Borders' 10th International Ecological Congress. (Includes landscape ecology as a topic) Pine Bay Holiday Resort Kusadasi, Turkey. November 1-6, 2005. Contact: Prof. Umit Email: erdem@ziraat.ege.edu.tr
- 2005 BES Annual Meeting 5-7 September, University of Hertfordshire.

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