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Editorial

Mapping the intellectual landscape of *Landscape and Urban Planning* (cover for Volume 106)

Maps are central to our understanding of landscapes. When this Editorship began to revise the journal's Aims and Scope for presentation in a forthcoming editorial, we sought ways in which we could identify the core knowledge base and boundaries, however permeable, of what the journal community considers to be *Landscape and Urban Planning* (LAND). Strategically, we also sought to better understand our niche among other knowledge communities and identify research themes and disciplines toward which the journal might more effectively communicate. Being somewhat familiar with bibliometric research, we asked for help from Elsevier's Research and Academic Relations Department, which provided us with a "Journal Citation Environment Map" for LAND based on a five-year analysis of citation frequencies shared between LAND and other journals. Using this work as a base, with some additional analysis and interpretation on our part we produced the version shown in Fig. 1, which we also feature as the cover image for this volume. The map represents our (imperfect) attempt to portray a "LAND's-eye view" of the conceptual structure of knowledge shared among it and 50 other journals.

Like a GIS analysis of the physical landscape, bibliometric analysis can reveal underlying relationships among journals and therefore help us understand the intellectual landscape of the research literature and the disciplines that contribute to it (e.g., Buter, Noyonsa, Van Mackelenbergh, & Lainec, 2006; Klavans & Boyack, 2006; Nassauer, 2009). While the details of the analysis are beyond the scope of this editorial (citation data and procedures for plotting the journal points are summarized in Appendix A), the following highlights are provided as keys to reading the landscape of LAND:

- *Distance:* The closer a journal is shown to LAND, the higher the average rate of citations shared between them, and, presumably, the more they have in common intellectually. For example, as shown in Fig. 1, the closest journal to LAND is *Landscape Ecology* – together, they cite each other an average of 37% of the time (37 out of 100 articles). By contrast, the furthest of the 50 journals from LAND is *Frontiers in Ecology and the Environment*; they cite each other only 3% of the time.
- *Color:* While the average rate of shared citations provides a useful metric to plot distance, it does not take into account the symmetry of the relationship. Here is where the color of the journal symbol comes into play. A yellow circle denotes that there is a more or less equal exchange of citations between journals; again using *Landscape Ecology* as an example, the 1-way citation data show that 31% of *Landscape Ecology* articles cite a LAND article, while 44% of LAND articles cite an article in *Landscape Ecology*. This symmetry could be interpreted as meaning that the knowledge base provided by each journal is drawn upon equally to inform the research reported in the other journal. Conversely, the green and red circles denote asymmetrical relationships. Journals with green circles tend to draw more upon work published in LAND than articles in LAND draw upon work published in those journals (e.g., 47% articles in *Urban Forestry and Urban Greening* cite LAND while 7% of LAND articles cite *Urban Forestry and Urban Greening*), while journals with red circles are more likely to be cited by LAND articles than to cite them (e.g., 9% of articles in *Biological Conservation* cite LAND articles while 29% of LAND articles cite *Biological Conservation*). Asymmetrical relationships may indicate any of several different relationships. On one hand, the journal with the higher percentage may have greater prestige, or feature articles of high significance or more timely interest. On the other, the journal with the lower percentage may be a less interdisciplinary journal, one that publishes papers on a narrower range of topics, or simply provides more discipline specific knowledge that is valuable to interdisciplinary research in the other journal.
- *Size:* The size of the circle for a journal is an indicator of its research impact as measured by the source normalized impact per paper (SNIP) score. Prestigious, highly cited journals such as *Trends in Ecology and Evolution* (SNIP = 7.143) are shown by large circles while young, small, specialized, and/or regional journals such as *Landscape Journal* (SNIP = .157) are shown with smaller circles.

While the distance, color, and size attributes of the journals on our map are relatively straightforward to interpret and plot, the adjacencies, groupings, and their thematic interpretation is more subjective. It is further hampered by plotting them in a 2-dimensional space, for there are likely interrelationships between journals other than LAND that are lost in viewing the plot as a single plane. Nevertheless, we began with the original clustering from Elsevier's citation map and arranged the symbols into six broad themes that we felt were helpful in characterizing the core and scope of the knowledge base covered by the journal. It should be noted that the boundaries between these thematic categories are by no means clear cut. These themes are:

- *Ecology:* Journals focused on the Ecology theme are heavily represented in the citation structure of LAND. As an interdisciplinary field that depends on ecology, landscape ecology has long been a

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Fig. 1. A citation and concept map of *Landscape and Urban Planning* and 50 related journals, 2007–2011.

central focus of the journal's Aims and Scope and the map's closest link to the journal *Landscape Ecology* reflects this relationship. At the same time, however, the map also shows a broad range of attention paid to applied ecology, including urban ecology, conservation biology and biodiversity studies, global ecology, forest ecology, restoration ecology, and animal ecology. It is also apparent that many of the journals shown are colored in red, indicating that while Ecology is an important discussion theme in LAND, research in the journal tends to draw more from the ecological sciences rather than contribute to it.

- *Planning and management:* A second cluster of journals includes multidisciplinary journals in environmental management as well as others with a more disciplinary or topical focus on landscape studies, urban forestry, forestry, wildlife, land use, and planning. Four of the journals positioned closest to LAND—*Urban Ecosystems*, *Urban Forestry and Urban Greening*, *Land Use Policy*, and *Landscape Research*—share (along with *Landscape Ecology* mentioned above) a strong thematic core focus on landscape and urban studies and their ecological, social, planning, and policy dimensions. In contrast to the Ecology theme above, the preponderance of green and yellow symbols for journals in the planning and management theme indicates LAND is seen as a leader and co-participant in the generation of interdisciplinary knowledge related to landscape planning and management.
- *Social science:* The theme labels appearing opposite each other on the map were not necessarily arranged to connote polarity across the 2-dimensional space. However, in the case of social science, there is a relatively clear gradient moving across the map from the GIScience to the Social science themes. Ecology journals such as *Biological Conservation* and design journals such as *Environment and Planning B: Planning and Design* offer occasional papers with a social science orientation, and the inclusion of social science papers becomes more prominent in journals clustering around the planning and management and sustainability science themes. Four journals cluster at the social science end of the map, offering articles in environmental psychology and other social science disciplines of relevance to LAND. Here again the yellow and green symbols indicate that LAND makes significant knowledge contributions to the social sciences, and other data collected since the beginning of this Editorship (September 2010) show that about 30% of all new submissions have a focus in whole or part in social science, including economics research.
- *Sustainability science:* The relative newness and integrative nature of sustainability science, along with the small number of journals in our sample that could be classified as belonging to it, made it somewhat questionable to identify sustainability science as a separate theme. Yet given the rapidly growing interest in measuring aspects of sustainability, we believe sustainability research is an important emerging area for LAND. Represented here by four journals, only *Ecology and Society* is positioned within the nearest half of our 50-journal sample in terms of conceptual distance to LAND. Nevertheless, an examination of article titles from these journals that cite LAND highlight important topics that fit well within the journals Aims and Scope, including valuing ecosystem services, examining of models of sustainable governance, quantifying natural capital, developing participatory social-ecological

models of ecosystems, and examining the role of urban green infrastructure in urban metabolism and succession toward sustainability.

- *Design and Engineering:* Along with "landscape ecology" and "landscape planning," "landscape design" has long been identified as a topic area within the journal's Aims and Scope. Yet unlike its companion topic areas, articles focusing on design or engineering appear much less frequently in the journal. Moreover, while designers and engineers are viewed as important consumers of research published by LAND, the journal's role in publishing design- and engineering-based research is less clear. While peer-reviewed research has not traditionally been emphasized as a means of advancing the design professions, both demand and opportunities appear to be ascending steeply (Gobster, Nassauer, & Nadenicek, 2010). The potential for building stronger links between design practice and interdisciplinary research is supported by the map data; while the yellows and greens show a sharing of knowledge between LAND and the 5 journals clustered under this theme, only *Planning and Design B* lies within the upper half of the journal sample in terms of conceptual distance to LAND. An examination of journal article titles that reference LAND within this theme shows a concern for design and engineering at a range of scales from buildings to sites to larger landscapes. Representative topics indicate the kinds of work being published in these journals that relate to the Aims and Scope of LAND: green roof performance characteristics, sustainable drainage design in new subdivision development, visibility and dominance analysis in high-rise building construction, cooling effects of urban greening in high-density cities, and a typological analysis of residential urban forms.
- *GIScience:* The last theme identified on our map clusters journals dealing with the analysis and portrayal of spatial information about landscapes. Because this is a largely methodological theme, we also juxtaposed those ecological and geographic journals dealing with modeling, monitoring, and the assessment of indicators along its margin. Journals forming the core of the GIScience theme tend to be colored in red and positioned near the far end in terms of their conceptual distance to LAND, with the exception of *Computers, Environment, and Urban Systems*.

As a tool for identifying the structure of scientific knowledge related to LAND, this citation map may be useful for understanding the journal's relative location in the conceptual landscape of scholarship. But it also raises formative questions about why such intellectual kinships exist and how they can be sustained. For example, what are the defining or signature characteristics that would not only make LAND more "attractive" to its own community of international scholars, but would also better connect it to the communities of other journals? Certainly the concept of landscape itself lies at the core of these relationships, and identifying a shared understanding of landscape among the various disciplines that use the term is essential for strengthening the journal's Aims and Scope. This will be the focus of our next editorial. As always, we welcome your thoughts and suggestions.

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Appendix A. Citation data and summary of procedures and decision rules for journal citation mapping

See Table 1.

A.1. Summary of procedures

The initial co-citation map provided by Elsevier included 41 journals and was based on total citations shared between journals for the years 2006–2010. The analysis did not take into account the number of articles published by each journal over this period, which we felt tended to over represent journals general science journals such as *Science* and *Proceedings of the National Academy of Sciences of the United States of America* and environmental journals such as *Acta Ecologica Sinica* and *Science of the Total Environment* that publish many hundreds of articles each year. Using Scopus, we ran a new analysis of citations between LAND and the other journals, updating the sampling to cover the years 2007 to February 15, 2012, and standardizing the citation rates in terms of number of citations per article. In doing so, several of the journals identified in the initial Elsevier analysis showed very low citation rates and were dropped from the analysis.

To this shortened list we added a number of other journals identified from a frequency analysis of citations from papers published in LAND between 2010 and February 15, 2012. To complete the 50-journal sample we added a few other journals that were not identified in either analysis but were felt to have a conceptual relationship to LAND (e.g., *Landscape Journal*, *Landscape and Ecological Engineering*). We recognize that our final list may have left out some journals with higher shared citation rates, but we feel confident that the number and diversity of those listed adequately characterize the knowledge structure of LAND.

A.2. Decision rules

Each journal was depicted by a symbol and location on the map using the following decision rules:

Distance-The average per article citation rate shared between LAND and another journal (last column in the table) was used as an indicator of conceptual distance, with higher percentages showing closer conceptual distance. Given the constraints of visually representing all 50 points on the map, the plotted distance between journals is ordinal rather than the actual linear distance.

Color-a journal symbol was colored red if articles in it were cited by articles in LAND more than twice the rate that LAND articles were cited in that journal. Conversely, a journal symbol was colored green if articles in it cited articles in LAND more than twice the rate that articles in LAND cited that journal. A journal was colored yellow if neither journal cited the other more than twice the rate.

Size- the size of the journal symbol was assigned based on its Source Normalized Impact per Paper (SNIP) score as reported in our February 2012 Scopus search. Journals with SNIP scores larger than 3 were symbolized with big circles, those with scores between 1 and 3 were given medium sized circles, and journals with SNIP scores under 1 were given small circles.

As mentioned in the editorial, the clustering of journals identified by the Elsevier analysis served as the starting point for positioning the journal symbols on our interpreted map. From this we iteratively arranged the symbols in a circle around LAND to interpret meaningful themes and boundary transitions, recognizing the limitations of 2-dimensional representation of journal knowledge interrelationships.

Table 1
Citation data for *Landscape and Urban Planning* and 50 related journals, February 2007–2012 (Scopus).

Journal title	SNIP	# Journal cites to LAND	# LAND cites to journal	# Journal articles	% Journal cites to LAND	% Land cites to journal	Average % cites
Agriculture, Ecosystems, and Environment	2.187	59	128	1214	0.049	0.162	0.105
Applied Vegetation Science	1.219	24	21	273	0.088	0.027	0.057
Arboriculture and Urban Forestry	0.514	25	10	226	0.111	0.013	0.062
Biodiversity and Conservation	1.443	99	135	1249	0.079	0.171	0.125
Biological Conservation	2.465	166	232	1763	0.094	0.294	0.194
BioScience	2.367	13	144	669	0.019	0.183	0.101
Building and Environment	2.609	52	33	1645	0.032	0.042	0.037
Computers, Environment and Urban Systems	2.143	28	66	250	0.112	0.084	0.098
Conservation Biology	2.886	56	250	1030	0.054	0.317	0.186
Diversity and Distributions	2.288	35	50	560	0.063	0.063	0.063
Ecological Applications	2.428	63	228	986	0.064	0.289	0.176
Ecological Economics	2.189	54	100	1499	0.036	0.127	0.081
Ecological Engineering	1.830	50	37	977	0.051	0.047	0.049
Ecological Indicators	1.788	80	54	863	0.093	0.068	0.081
Ecological Modelling	0.565	99	114	1993	0.050	0.144	0.097
Ecology and Society	2.314	66	67	557	0.118	0.085	0.102
Environment and Behavior	2.100	32	80	198	0.162	0.101	0.132
Environment and Planning B: Planning and Design	1.117	58	81	341	0.170	0.103	0.136
Environmental Management	1.117	135	126	945	0.143	0.160	0.151
Environmental Monitoring and Assessment	0.954	89	57	3305	0.027	0.072	0.050
Environmental Science and Policy	1.836	20	35	457	0.044	0.044	0.044
Forest Ecology and Management	1.726	110	120	2886	0.038	0.152	0.095
Frontiers in Ecology and the Environment	3.655	12	39	669	0.018	0.049	0.034
Global Ecology and Biogeography	2.767	16	68	474	0.034	0.086	0.060
Human Ecology	1.302	21	25	320	0.066	0.032	0.049
International Journal for Remote Sensing	1.184	44	84	2147	0.020	0.106	0.063
International Journal of Geographical Information Science	2.439	26	70	378	0.069	0.089	0.079
International Journal Sustainable Development & World Ecology	0.487	38	8	285	0.133	0.010	0.072
Journal for Nature Conservation	1.011	27	34	167	0.162	0.043	0.102
Journal of Animal Ecology	2.199	9	45	765	0.012	0.057	0.034
Journal of Applied Ecology	2.809	50	121	849	0.059	0.153	0.106
Journal of Environmental Management	2.030	151	160	1812	0.083	0.203	0.143
Journal of Environmental Planning and Management	1.226	50	53	267	0.187	0.067	0.127
Journal of Environmental Psychology	2.757	42	82	236	0.178	0.104	0.141
Journal of Forestry	0.826	28	47	418	0.067	0.060	0.063
Journal of the American Planning Association	2.083	12	65	142	0.085	0.082	0.083
Journal of Urban Design	0.753	14	4	119	0.118	0.005	0.061
Journal of Wildlife Management	1.354	31	51	1320	0.023	0.065	0.044
Land Use Policy	1.691	146	98	557	0.262	0.124	0.193
Landscape and Ecological Engineering	0.311	28	3	168	0.167	0.004	0.085
Landscape and Urban Planning	2.082	626	626	789	0.793	0.793	0.793
Landscape Ecology	1.856	189	344	609	0.310	0.436	0.373
Landscape Journal	0.157	14	17	51	0.275	0.022	0.148
Landscape Research	1.097	75	63	170	0.441	0.080	0.261
Photogrammetric Engineering and Remote Sensing	1.061	10	89	565	0.018	0.113	0.065
Remote Sensing of Environment	4.328	24	96	1486	0.016	0.122	0.069
Restoration Ecology	1.519	26	52	625	0.042	0.066	0.054
Society and Natural Resources	1.021	36	57	372	0.097	0.072	0.085
Trends in Ecology and Evolution	7.143	6	97	624	0.010	0.123	0.066
Urban Ecosystems	0.996	87	77	214	0.407	0.098	0.252
Urban Forestry and Urban Greening	1.146	85	57	175	0.486	0.072	0.279

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