



The 8th World Congress of the International Association for Landscape Ecology

landscape ecology for sustainable environment and culture

PROCEEDINGS

Aug. 18-23, 2011, Beijing, China



Sponsor

International Association for Landscape Ecology (IALE)

Organizers:

- IALE-China Chapter
- Ecological Society of China
- Research Center for Eco-Environmental Sciences, CAS
- Peking University

Supporting agencies

- Chinese Academy of Sciences (CAS)
- National Natural Science Foundation of China (NSFC)
- State Key Laboratory of Urban and Regional Ecology
- WWF China
- Chinese Ecosystem Research Network (CERN)
- Chinese Ecological Restoration Network (ER-China)



International Association
for Landscape Ecology



Ecological Society
of China



Research Centre for
Eco-Environmental
Sciences, CAS



Peking
University



Chinese Academy
of Sciences



National Natural Science
Foundation of China



WWF
China



State Key Laboratory of
Urban and Regional Ecology



Chinese Ecosystem
Research Network



www.ER-CHINA.com

Chinese Ecological
Restoration Network

The Whole is more than the Sum of Its Parts - the Potential of Landscape Metrics in the Assessment of Land-use Changes

Ulrich WALZ

Leibniz Institute of Ecological and Regional Development, Dresden, 01217, Germany

E-mail: u.walz@ioer.de

Landscapes and open space in central Europe are still under pressure due to settlement development and fragmentation by technical infrastructure. Concurrently agriculture experiences an enormous intensification process, especially by growing plants for bio fuel. All of these changes in land use often take place as small-scale individual measures, insignificant in themselves. However, over the long-term, the accumulation of such minor changes can lead to significant shifts in landscape structure – and hence also to the abiotic and biotic functions and potentials of a landscape environmental conditions.

Such structural changes in landscapes can be detected, measured and monitored by the means of landscape metrics (Walz, 2008). They can be used to describe the composition and spatial arrangement of a landscape – such features as size, shape, number, type and arrangement of landscape elements. Especially in the context of biodiversity, landscape metrics play a considerable role in the analysis and assessment of diversity of landscapes, to carry out isolation or connectivity analysis and to recognize and to monitor the results in changing landscapes (Bolliger et al., 2009; Uuemaa et al., 2009).

The contribution will give examples for the application of landscape metrics in monitoring of land use changes and the detection of cumulative effects. Also effects on Landscape Services were evaluated. In the focus are the topics of land use changes in rural and protected areas (structural changes in sizes of land units, distribution of grassland etc.) and the development of landscape fragmentation by infrastructure and development of settlements in Germany.

Results of the investigations in rural areas show, that small-scale structural changes at a whole have significant effects on Landscape Services, e.g. on Regulating Services (Soil Erosion) (Wolf et al., 2009) or Cultural Services (Recreation). Also effects on biodiversity can be observed: Comparisons between historical and actual landscape structure as well as the diversity of plants indicated a decrease within the last 50-60 years (Walz and Müller, 2009). Methods and indicators for evaluation of changes in land use and fragmentation including the degree of naturalness, the connectivity of biotope corridors as well as the permeability of roads are presented. Because the small scale landscape structure between these corridors is also very important, a concept postulating large core areas, connecting biotope corridors as well as a small scale diverse landscape between these areas is proposed.

A Software Framework for Food Provisions Simulation and Integration with HASM

Chenliang WANG¹, Tianxiang YUE^{1,2}, Qing WANG¹

¹ *Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, 11A, Datun Road, Anwai, 100101 Beijing, China;* ² *Ecological Complexity and Modeling Laboratory, University of California, Riverside, CA 92521-0124, USA*

E-mail: Wangcl@reis.ac.cn