



Bulletin

International Association for Landscape Ecology

SIMULATION MODELS OF ANIMAL BEHAVIOR ARE USEFUL TOOLS IN LANDSCAPE AND SPECIES MANAGEMENT

by Chris Topping and Jane Uhd Jepsen¹

Evaluating effects of anthropogenic activities on the natural component of our environment is an important task. A prerequisite, if we wish to make any evaluation of the changing state of the environment on a landscape scale, is to have a solid basis from which we can objectively assess changes in biotic content. This is an exceedingly difficult task. The Animal, Landscape and Man Simulation System (ALMaSS) was designed to circumvent some of the difficulties of assessing the effects of landscape changes on animal species. This was done by adopting a simulation approach where ecological models of the organisms investigated are integrated into a single environment, in a process analogous to that which actually occurs in the real world.

The ALMaSS system consists of two main components: The Landscape Model is a dynamic simulation of a section of a real landscape. At present the model can contain spatial information about 10.000 x 10.000 units (e.g. 10 x 10 km with a resolution of 1 meter). This allows for a very detailed representation of landscape structures such as field boundaries, roadside verges etc. (Fig. 1). The dynamic processes in the landscape, such as weather, traffic, vegetation growth and farming and management activities are simulated on a daily basis.

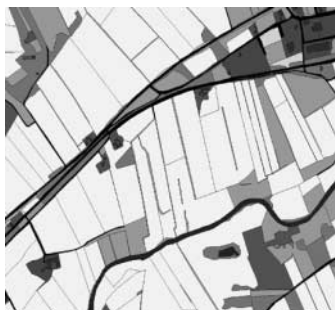


Fig. 1. A 1x1 km section of an agricultural landscape represented in the ALMaSS landscape model.

The second component consists of the Species Models. The demography and behaviour of each species is modelled using individual-based techniques. This means that each individual in a population is represented explicitly in time and space. At present working models exist for skylark (*Alauda arvensis*), field vole (*Microtus agrestis*), roe deer (*Capreolus capreolus*), carabid beetle (*Bembidion lampros*) and linyphiid spiders (*Linyphiidae*). The individuals in the model act by sensing information from their local surroundings following a set of behavioural rules. They can communicate, reason, and act to pursue their own agenda of survival and reproduction. Each individual therefore interprets these rules based on local information from the landscape model. This results in complex and realistic dynamics due to potential for local positive/negative feedback at the individual level.

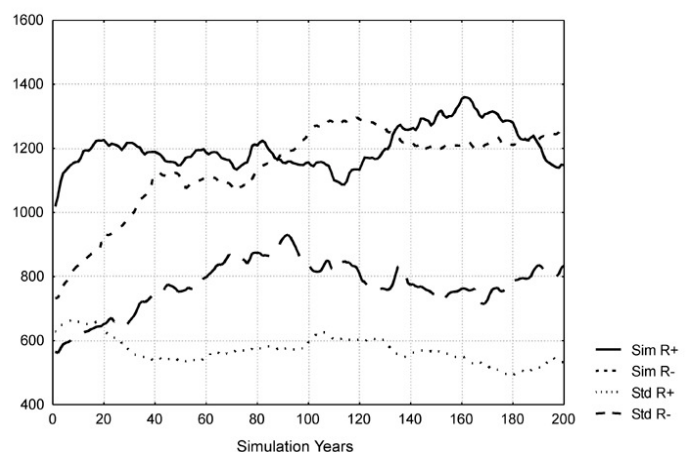


Fig. 2. Field vole population sizes under four different management regimes.

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...continued from p. 1 (ALMaSS model)

ALMaSS is best viewed as an experimental system for comparing scenarios. The spatial information in the landscape model can be manipulated to represent proposed changes in management, farming practices or land use, and the effects of alternative strategies on the distribution and abundance of the target species can be evaluated. A variety of model outputs are possible depending on the focus of the investigation: Individual attributes such as growth rates or survivorship, population development and dynamics over time (Fig. 2) or spatial distribution of individuals are among the possibilities.

The individual-based approach also opens up the possibility to incorporate genetics in the species models and thus to track the genetic population structure (Fig. 3) as it develops e.g. in fragmentation or mortality scenarios.

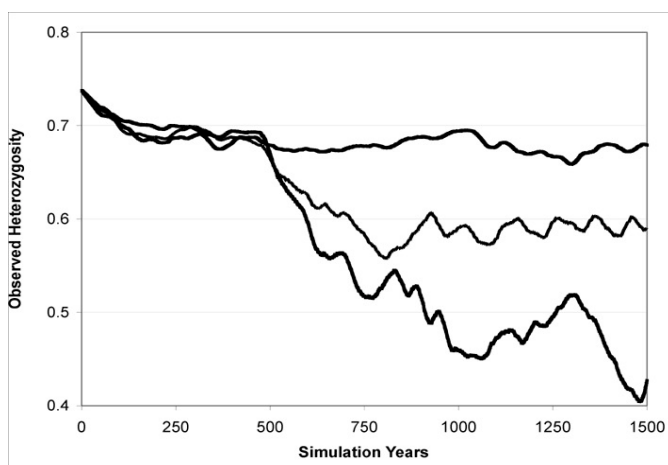


Fig. 3. Predicted genetic diversity in a population of vole under three different mortality regimes (mortality applied after 500 years).

The ability to model both general situations and specific cases opens up vast possibilities when considering human impact on nature. The simulations can be used to investigate specific management problems, such as reserve management, location and design of wildlife corridors or hunt-

ing strategies. It is currently being applied in Denmark to evaluate the impact of pesticides on non-target organisms. Policy decisions regarding farming or landscape management could be evaluated for their impact on the range of species modelled and their analogues in the environment in question. To achieve these goals the addition of carefully selected species and the ability to generate new landscapes are of vital importance.

ALMaSS on the Web: <http://almass.dmu.dk/>

IALE-INTERNATIONAL STATUTES FOR DOWNLOAD ON THE WEB!

In order to stimulate the set-up of new regional IALE chapters, the most recent IALE statutes (1999) are on the Web in either Word or pdf Format (<http://www.wsl.ch/land/iale/bulletin.htm>, attachment to the Bulletin No. 20.3, July 2003 or directly via ftp: ftp://ftp.wsl.ch/pub/kienast/iale/IALE_statutes.pdf or ftp://ftp.wsl.ch/pub/kienast/iale/IALE_statutes.doc)

VICE PRESIDENTIAL ELECTIONS 2001

Due to an unfortunate combination of factors the Vice Presidential elections, that should have been held in 2001, did not take place. These elections would have been to replace or re-elect VPs Kathy Freemark (Canada) and Xiao Duning (China), who had both completed a 4-year term.

At the IALE Executive meeting, held in Wageningen in June 2002, it was decided that both Kathy Freemark and Xiao Duning would be asked to extend their term to 2003. The two other Vice Presidents, Francoise Burel (France) and Margareta Ihse (Sweden), who were elected in 1999, have been asked to remain as Vice Presidents until 2005. By adopting these measures the sequencing of Vice Presidential positions will return to their statutory rotation by 2005.

Michael Moss, Secretary General IALE.

The IALE Bulletin is distributed six times a year to the members of the IALE. The IALE - International Association for Landscape Ecology - was founded in 1982 to promote communication between scientists, planners and interdisciplinary scientific research. IALE Executive Committee: **President:** Richard J. Hobbs (CSIRO Wildlife and Ecology, Private Bag, P.O., Wembley WA 6014, Australia), tel +61 8 9333 6442 fax +61 8 9333 6444 email Richard.Hobbs@per.dwe.csiro.au, **Past President:** John A. Wiens (USA), email jaws@lamar.colostate.edu, **Vice Presidents:** Duning Xiao (China), email Indscp@iae.syb.ac.cn, Kathryn Freemark (Canada), email kathryn.freemark@ec.gc.ca, Margareta Ihse (Sweden), email ihse@natgeo.su.se, Francoise Burel (France), email francoise.burel@univ-rennes1.fr, **Secretary General:** Michael Moss (Faculty of Environmental Sciences, University of Guelph, Guelph, Ontario, N1G 2W1 Canada), tel +1 519 824-4120 ext.4800 fax +1 519 763-4686 email mmoss@uoguelph.ca, **Bulletin Editor and Deputy Secretary General:** Felix Kienast (Swiss Federal Institute of Forest, Snow and Landscape Research WSL, CH-8903 Birmensdorf, Switzerland), tel +41 1 739 23 66 fax +41 1 737 40 80 email felix.kienast@wsl.ch, **Treasurer:** Rob Jongman (WAGU, Department of Physical Planning and Rural Development), Gen. Foulkesweg 13, 6703 BJ Wageningen, The Netherlands, tel +31 317 483 713 fax +31 317 482 166 email R.H.G.Jongman@Alterra.wag-ur.nl

IALE on the Internet: IALE International: <http://www.iale.ws>

NOMINATION FORM FOR ELECTIONS TO THE IALE EXECUTIVE 2003-2007

The following positions on the IALE Executive Committee will become vacant at the time of the World Congress in Darwin, Australia, in July 2003:

- President
Two Vice Presidents
Secretary General
Treasurer
Bulletin Editor

Nominations are now being solicited for these positions from amongst the IALE membership. Nominations, using the form included in this issue of the Bulletin should be completed and received by the Secretary General by October 31st., 2002. Once received the nominations will be placed in the hands of the Nominating Committee. The composition of this committee will be announced in the next issue of the Bulletin. The Chair of the Nominating Committee will be responsible for the subsequent elections. The election results will be announced at the General Assembly of IALE at the World Congress in Darwin. Michael Moss, Secretary General IALE.

Position sought:-----
Name of candidate:-----
Signature of candidate:-----
Address of candidate:-----
(email)-----

Nominated by: -----(IALE member)
Seconded by: -----(IALE member)

This form should be submitted to the Secretary General by October 31st., 2002: Michael Moss, Secretary General IALE, Faculty of Environmental Sciences. Blackwood Hall, University of Guelph, Guelph, Ontario N1G 2W1, Canada. E-mail: mmoss@uoguelph.ca. Fax: +1 519 763 4686.

20TH ANNIVERSARY OF IALE THIS YEAR!

Some of you may have recognized that IALE celebrates its 20th birthday in 2002. However, since there is no IALE World congress in 2002, the Executive Committee decided to celebrate the founding of IALE as a 21st anniversary at the 2003 World Congress in Darwin, Australia. Be sure to attend the birthday party!

IALE WORLD CONGRESS 2003 IN AUSTRALIA: SEND EXPRESSION OF INTEREST!

The conference secretariat (Convention Catalysts Int.) is now open to receive your expression of interest. You can register as follows:

- a) directly via http://www.iale.ntu.edu.au/registration.html
b) via downloaded flier (http://www.wsl.ch/land/iale/bulletin.htm, attachment to the Bulletin No. 20.3, July 2003 or directly via ftp: ftp://ftp.wsl.ch/pub/kienast/iale/darwin_interest.pdf)
c) send form below to Convention Catalysts Int., GPO Box 2541, Darwin NT 0801, Australia (convention.catalysts@norgate.com.au; Ph: +61 8 8981 1875, Fax: +61 8 8941 1639)

Title: _____
Name: _____
Organisation: _____
Address: _____
Phone: _____
Fax: _____
E-mail: _____

- () I am interested in attending
() I am interested in sponsorship opportunities
() I am interested in trade exhibition opportunities
() I am interested in presenting at the conference
() Oral Presentation
() Poster Presentation

My presentation would be appropriate for the Conference Symposium theme of

(Please note that the symposium programs are being developed by the symposium organisers. Only one paper per presenter will be accepted.)

To register your expression of interest and receive further information, please fax, e-mail or mail this form to the conference secretariat:

Convention Catalysts International

GPO Box 2541
Darwin NT
Australia
Ph: +61 8 8981 1875 Fax: +61 8 8941 1639
Email: convention.catalysts@norgate.com.au



DEVELOPMENTS REGARDING THE JOURNAL "LANDSCAPE ECOLOGY"

For a number of years the IALE Executive has been concerned about the lack of papers submitted to "Landscape Ecology" by members from outside North America, in particular members whose first language is not English. The Executive has investigated several possibilities that would make the journal more representative of the international scope of Landscape Ecology. The Executive has become very aware of the reluctance of non-English speakers to submit papers for review and, at the same time, has recognized the efforts of the various Editors to support papers that may be scientifically of great value but which would require very extensive work prior to these papers being sent out for refereeing.

The Executive, in consultation with the Editor of "Landscape Ecology", David Mladenoff, proposed the following strategy for members whose first language is not English and might not be familiar with the style and requirements for publishing in International Journals. The proposal is that IALE, through the office of the Secretary-General, will provide a voluntary service to work with authors to bring their papers up to the standard required for submission to the Editor for the normal review and refereeing process. Please note that this is not a first stage in the refereeing process and the people involved as advisors will not judge the suitability of the content for publication in the Journal "Landscape Ecology". Members of IALE that would like to make use of this service should send their manuscripts directly to:

Michael R. Moss, Faculty of Environmental Sciences, University of Guelph, Guelph, Ontario, Canada, N1G 2W1 (mmoss@uoguelph.ca)

MEETINGS

November 6-8, 2002

Landscape Ecology and Management of Atlantic Open Mountain Landscapes, Guarda (Serra da Estrela Natural Park), Portugal

The aim of this workshop is to identify the unique features of these landscapes, and their associated biodiversity, by holding a workshop including appropriate experts across the region. These landscapes share many characteristics, especially their open nature with few boundaries except walls, even although there are many local variations. Management problems are present in the region because of changes in agricultural practice, causing abandonment in some areas but overuse in others. It is intended that the discussions will lead to the identification of proposals for appropriate policies for the distinctive features present. The conference proceedings will be published, includ-

MEETINGS (cont.)

ing both the presented papers as well as records of the discussions, although the final format has not yet been decided.

Organization by APEP and ALTERRA; Support by Serra da Estrela Natural Park

Information and registration: Teresa Pinto-Correia: mtpc@uevora.pt or Bob Bunce: R.G.H.Bunce@alterra.wag-ur.nl

March 24-26, 2003

State of the Art in Vegetation Monitoring Approaches, Swiss Federal Research Institute WSL, Birmensdorf.

The aim of the symposium is to portray and link the know-how in different fields involved in environmental monitoring (botany, ecological modeling, statistics). Standards for sampling and storage of data useful in a broad range of long-term vegetation surveys shall be worked out. The contributions shall include methodological aspects (e.g. short and long-term vegetation monitoring, descriptive analysis, environmental modeling) as well as management aspects of monitoring (e.g. development and update of large data bases).

Information and electronic registration are available at:

<http://www.wsl.ch/land/monitoring/>

October 24-26, 2002

Landscape Ecology, Land Use Planning and Nature Conservation, Évora, Portugal

Organization: Centro Estudos Ecosistemas Mediterrânicos.

Information and registration: Teresa Pinto-Correia: mtpc@uevora.pt

April 2-6, 2003

US-IALE meeting 2003: Beyond Borders - Linking Landscapes, Banff Centre, Alberta, Canada

The 2003 US-IALE conference will address issues such as the natural essence as residents of landscapes, thereby inspiring solutions that take us beyond borders, toward a balanced sustainable world of energy, matter and information flow.

The 2003 US-IALE conference will also address watersheds and aquatics restoration issues and we are pleased to embrace the International Year of Fresh Water, a United Nations Initiative that will be celebrated throughout 2003 in and around the Mountain Parks.

Tentative Activities include:

- Beyond Borders Workshop
- Experiential Ecology Exercise for Dream Teams Composed of Senior and Junior Scientists
- First Nation Participation
- Environmental Fluxes and Species Movements at Several Scales
- Mini-courses in Biophysics, Complexity and Scaling

Information and registration: http://www.zoo.utoronto.ca/US-IALE_2003/