EARTHWATCH INSTITUTE FIELD REPORT

Earthwatch Institute Mission: *Earthwatch engages people worldwide in scientific field research and education to promote the understanding and action necessary for a sustainable environment.*

Earthwatch Institute uses the UNESCO Definition of a Sustainable Environment*:*
A sustainable environment is one in which the natural environment, economic development and social life are seen as mutually dependent - and the interaction between them contributes to the sustainability and enhancement of the quality of people's lives and the natural environment.

This field report will be publicized on our weblink with the United Nations Environment Program (UNEP) World Conservation Monitoring Centre (WCMC) at www.unep-wcmc.org. This website is available to the general public.

Project Title: Baltic Wetlands and Wildlife

Principal Investigator: Dr Chris Joyce

Position/Affiliations: Principal Lecturer in Environmental Geography, University of Brighton, UK

Research Site(s): Vormsi island, Silma and Matsalu, West Estonia

Local Management Status of the Research Site(s): National Park, Ramsar site, IBA (Matsalu); Biosphere Reserve, IBA (Vormsi, Silma).

Scientific names of primary species being studied:

Key Research Objectives:

- **To establish the sensitivity of biodiversity to abandonment in coastal wet grasslands in West Estonia**
- **To classify coastal wetlands in relation to sensitivity to abandonment**
- **To identify and assess the abundance of biodiversity indicators in relation to abandonment**
- **To monitor any recovery in biodiversity following the restoration of management**
- **To examine plant and animal community dynamics following vegetation cutting**
- **To establish the relationship between hydrodynamics and plant communities in West Estonian coastal wetlands**

Data Collection and Results

a) Give a concise account of the data you have collected during the past field season.
Data collection in 2004 focussed upon progressing three key elements of the project: habitat mapping and assessment; bird monitoring and habitat use; and plant community experiments. Habitat mapping continued the baseline assessment of key wetland sites of international biodiversity importance. On Vormsi island, a further 60ha of Diby, a botanically-rich abandoned site, was mapped to add to the 20ha completed in 2003. On the mainland, two managed sites of bird importance were mapped for the first time, namely Kudani (30ha) and Matsalu (80ha). Breeding bird surveys were repeated for the third year running, with 36 transects carried out at on Vormsi island and at Silma on the mainland. Further information on bird use of wetland habitat in relation to abandonment will be derived from a substantial new survey undertaken in 2004; 73 point counts (including 11 repeats) were made in managed and unmanaged wetland sites. Experiments to examine the response of plant communities to management were also maintained, incorporating sampling 64 permanent quadrats at Hosby, Vormsi island and Tahu, Silma. A short run of data were collected from a water level monitor installed at Hosby as part of a pilot test of hydrological equipment.

b) What progress have you made towards achieving your original objectives?
Two of the original objectives were to describe coastal wetlands in relation to sensitivity to abandonment and to assess the abundance of key biodiversity indicators. Field data collection towards these objectives has largely been completed through habitat mapping and assessment of sites along a management gradient, and bird and small mammal surveys. Analyses of these data have already been used in an introductory paper (Joyce and Burnside, 2004) and oral presentations. Analysis is continuing in order to publish two scientific papers, on wetland habitats/landscapes and small mammals as indicators, before focussing upon bird biodiversity and wetland habitats. Field effort is now centred more towards achieving the third original key objective, which is to monitor the effects of reinstated management on wetland biodiversity. Two field experiments have been set up where management is applied and these have been surveyed in 2003 and 2004. Further experiments (including vegetation and small mammal sampling) are due to be initiated in 2005.

c) Please provide a summary of your results (even if they are preliminary).
Mapping and describing wetland habitats now extends to over 350ha of west Estonia's finest and most threatened coastal sites. Results of this survey have shown that the scale of biodiversity assessment is important. A comparison of habitat composition within wetland landscapes using ordination shows that there is a relationship between abandonment and coastal habitat diversity (Figure 1). A continuously managed site, Tahu north, is characterised by short wet grassland habitat, which is particularly valuable for nature conservation. However, other habitats are not so well-represented at Tahu north. At the other end of the management scale is Hosby, which has been unmanaged for 25 years, and this site is typified by reed bed with little habitat diversity. However, sites with maximal habitat diversity (e.g. Sviby, Hullo West), which support many different vegetation types, are associated with variable management histories and topographic or spatial variety, suggesting that at this rather broad scale diversity is best represented by a mosaic of habitats. The relationships between scale, abandonment/management and wetland diversity are currently being examined through further multivariate analysis.

Preliminary results from the bird point counts show community differences between managed (grazed) and essentially abandoned sites with key habitat indicator species varying in their abundance. Chaffinch and Willow warbler are indicative of landscapes becoming overgrown with shrubs and trees and were most frequent at such wetland sites. Reed warbler and Reed bunting inhabit stands of reeds and were particularly frequent at Hullo on Vormsi island, which has been abandoned for over 10 years such that reeds have encroached. Birds of open grassland landscapes, particularly Skylark, and wading birds were most abundant at well-grazed coastal wetlands represented by Matsalu and Kudani. Overall, these two managed wetlands supported more than twice as many indicator birds as unmanaged sites (Table 1), indicating that bird density generally may be higher at managed compared to abandoned coastal wetlands.

Table 1. Mean number of indicator bird observations during point counts in July-August 2004. Italicized sites are regularly managed (grazed). Numbers in parentheses are the number of counts taken at each site. Waders refer to nine species recorded during the survey, the most frequent of which were Snipe and Lapwing.

Site	Chaffinch	Willow warbler	Reed warbler	Reed bunting	Meadow pipit	Skylark	Waders	Total
Hosby (6)	0.2	0.4	0.4	0.4	1.2	0.2	0	2.8
Diby (7)	0.3	0.6	0.3	0.4	0.1	0.1	0.7	2.5
Rumpo (5)	0.4	0.4	0.4	0.2	0.2	0.4	0.2	2.2
Hullo (12)	0	0	0.5	0.8	0.4	0.6	0	2.3
Matsalu (19)	0	0	0.1	0.3	1.6	2.1	1.4	5.5
Kudani (12)	0	0.1	0.3	0.1	0.5	1.3	3.6	5.9

Plant community data from two years of the field experiments have been collated in an Excel database and will be analysed in 2005 at the end of the first phase of the experiments.

Significance/Benefits of Research

a) What is/are the significance/benefits of your research at the following levels?

- local (in the area of the research site) - The research data are used within a Geographic Information System managed by Estonian stakeholders that is used to direct planning and development in the area of the research site. The data are contributing to management plans and proposals at nature reserves within the research area. The data are also being used to monitor and guide existing/ reinstated management for biodiversity action plans within the research area. From 2004, the data will help guide wetland monitoring in West Estonia.

- national – It is expected that national agri-environmental policies will be influenced by the research in West Estonia. Earthwatch data and experience will be used within the new Darwin-funded project to facilitate this.
- International – The research has been logged within a European Union data base of wetland projects of international scope. Good practice for wetland management and monitoring, as developed through the Earthwatch project, will be disseminated via the Darwin-supported project that began in 2004.

b) How do your findings contribute to issues of sustainability?
Research findings are being used by key partners NGO Laanerannik (a conservation charity in West Estonia) and Matsalu and Silma nature reserves to develop sustainable management of the coastal wetland resource. This includes reinstating appropriate intensities of cattle grazing and demonstrating the conservation benefits of appropriate agricultural activity. The research has been cited at meetings between land owners and conservation organisations with the aim of reconnecting local communities with agricultural activity. The project GIS database has also been used as a planning tool to aid decision-making for proposed developments.

Dissemination of Results

a) Have you provided details of results from your research to or within:

- Scientific papers (indicate status; e.g., peer reviewed or in progress/press)
    - Joyce, C.B. and Burnside, N.G. (2004) Baltic coastal wetlands: back from the brink? *National Wetlands Newsletter*, **26**,11-15
    - Burnside, N.G., Joyce, C.B. and Puurmann, E. (in progress) The effects of abandonment on coastal wetland landscapes: a case study from West Estonia. To be submitted to *Landscape Ecology*
    - Scott, D.M. and Joyce, C.B. (in progress) Landscape structure and small mammal community composition in coastal wetlands, West Estonia.
- Management plans and reports (in progress or completed)
    - Randla, T. and Ojaste, I (in progress) Management plan for Silma nature reserve. Silma Nature Reserve Authority, Estonian Ministry of the Environment
- Presentations (given or planned)
    - Joyce, C.B. (2003) *Baltic Wetlands: Biodiversity Today*. The Earthwatch Lecture Series at the Royal Geographical Society, London. Invited lecture to approximately 200 supporters of Earthwatch and their guests.
    - Joyce, C.B. and Burnside, N.G. (2004) *Integrating field survey and GIS for Estonian coastal wetland conservation*. Plant Biogeography and Vegetation Study: Methods, Problems, Solutions, University College Chester. Seminar presentation to 25 academics and post-graduates