

RSEARCH EDIT HAS BEEN DONE!!!

November 2006

Dear Volunteers

Baltic Island Wetlands and Wildlife

Many thanks from myself, Niall, Maureen, Silvia, Elle, James and Marko for all your hard work, good humour and enthusiasm during 2006. This is particularly the case for those teams challenged by long days of hot weather and swarming horseflies.....although I think everyone had a good time, helped no doubt by great team spirit, saunas, and lots of special wildlife.

This year we really tested your abilities to be flexible and versatile, as we had so many different activities going on. Each team rose to the challenge and contributed to the successful maintenance of existing projects as well as trying something new. The established vegetation experiments at Hosby and Tahu were sampled (72 plots) and the disturbance experiment at Rumpo was treated to two full surveys (a total of 178 plots). Breeding bird surveys continued for the fifth year running with 39 transects completed, adding even longer-term value to the established database. In addition, 82 bird point counts were taken at 12 sites, representing one of the highest yearly totals ever. The eight hydrological monitoring stations were checked and any data downloaded, with much repairing of equipment and fencing where necessary! Incredibly, teams still found time to take 138 baseline soil samples; cut 32 vegetation plots (in the style of a cow!); set up and sample 10 new vegetation monitoring plots; collect insect traps at Vormsi island, Silma and Matsalu nature reserves; and walk five transects to assess wild boar activity. But it didn't stop there, because even when field work was done you just kept on working, cataloguing almost 100 specimens for the Earthwatch herbarium.

The data have been entered onto computer spreadsheets for inclusion into the Geographic Information System (GIS) and have been disseminated amongst all Estonian and other stakeholders. Two scientific papers are well on the way to being published so that we can spread the results of all of this hard work far and wide.

There was still time for teams to take the 'Baltic Birdwatching Challenge' and Team I did just that, recording an excellent total of 121 species, which is not far short of the all-time record. Not to be outdone, Team II set the record for the most horseflies eaten in the course of duty and Team III definitely got the best tans!

Next year, we plan to build on the excellent work of this summer by continuing to sample vegetation in all the experiments and to survey birds. It is now almost a full-time job maintaining the existing research during the field season, but we still hope to find time to extend the project further by examining the possible impacts of sea level rise due to climate change on Estonian coastal wetlands.

Once again, thanks for your support in 2006 – keep in touch via the web site at www.vormsi.ee/darwin/

Dr Chris Joyce
Principal Investigator



Field Report

Congratulations on completing your Earthwatch Institute field season! We are eager to hear about your season in detail and to learn about your research progress!

This field report provides us with exciting information to disseminate to volunteers and the general public, and gives you an opportunity to let us know what worked well this season, and where you would like to see improvements. This report will be used by Earthwatch to document and evaluate the progress you have made towards your research objectives and how volunteers helped you achieve these goals. We recognize that your results may be preliminary or descriptive.

The field report is also a vital component to help us assess whether we are achieving our mission: *Earthwatch engages people worldwide in scientific field research and education to promote the understanding and action necessary for a sustainable environment.*

Field report guidelines

Earthwatch Institute Principal Investigators must submit a field report within three months of completing each season's field-work. Please limit your field report to seven pages maximum.

Your field report will be:

- Published in the project briefing for the following year, unless you specify in writing otherwise;
- Sent to all your Earthwatch team members from the past year; and
- Section I will be used for our new United Nations Environment Programme –World Conservation Monitoring Centre (UNEP-WCMC) web link (explained further below).

Part or all of your field report may be:

- Used to publicize your work in the *Earthwatch Member Journal*, Earthwatch's annual report, on Earthwatch's World Wide Web site, and other media and evaluation outputs.

Section I

This year, we are very excited to introduce our new partnership with UNEP-WCMC! UNEP-WCMC is internationally recognized as a provider of global biodiversity information services for policy and action to conserve the living world. The Centre's activities include assessment and early warning studies in forest, dryland, freshwater and marine ecosystems.

Publicizing Section I of the field report on the UNEP-WCMC/Earthwatch website link (www.unep-wcmc.org) will connect you to other scientists in your field and will broaden the reach of your disseminated results. The website will hopefully serve as an invaluable resource to you as well! Please note that the website is in a pilot phase, and although UNEP is currently only soliciting results from biodiversity/endangered ecosystem projects, it plans to expand the website to encompass all Earthwatch Institute funded research projects.

Section II

Sections I and II will be sent to volunteers who participated on your project during the past field season, and for internal Earthwatch Institute evaluation purposes.

Formatting

Please submit an electronic copy (cd-rom or email attachment) of your field report to your Earthwatch Program Manager. Because both scientists and non-scientists will read this report, please keep the language accessible to the layperson.

When composing your field report, please use a 10-12 point commonly available font (e.g. Times, Times Roman, Arial, Century Gothic, etc.) and keep it to a length of 6-10 pages. Feel free to send additional graphs, maps, photos, etc. as appendices to the main field report. The volunteers and Earthwatch staff appreciate these as well.

When attaching *images*, please save them in the following formats: JPEG, BMP, PICT; and when saving *text/data sheets*, please use MSWord products: DOC, .XLS, .PPT, .dat, .txt, .htm, .html, .pdf, .rtf, dos-based formats. Earthwatch does not have the capability to read WordPerfect or Mac-specific formats.

Please call your Program Manager if you have any questions.

Thanks again! We look forward to another season of productive research and field activities!

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.

SECTION I: UNEP- WCMC WEBLINK INFORMATION

Section I of the 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.

Both Sections I and II will be sent to Earthwatch Institute volunteers who participated on your field project. If there is any part of Section I that you would prefer **not** be shared with volunteers, please indicate using the * symbol.

Project Title: Baltic Wetlands and Wildlife

Principal Investigator (s): Dr Chris Joyce

Position/Affiliations: Principal Lecturer, University of Brighton, UK

E-mail address: C.B.Joyce@bton.ac.uk

Research Site(s) (geographic location, include coordinates if known, e.g. Lat/Long):

Vormsi island, Silma Nature Reserve, and Matsalu National Park, west Estonia

Local Management Status of the Research Site(s) (e.g. National Park, RAMSAR Site, World Heritage Site, IBA etc.): Ramsar site, National Park, IBA, Natura 2000 (Matsalu); National Nature Reserve, Biosphere Reserve, Natura 2000 (Silma); Landscape Protected Area, Biosphere Reserve, Natura 2000 (Vormsi)

Scientific names of primary species being studied (if appropriate):

Key Research Objectives (5-8 brief bullet points):

- to establish the sensitivity of biodiversity to abandonment in coastal wet grasslands
- to classify coastal wetlands in relation to abandonment
- to identify and assess the status of biodiversity indicators in relation to abandonment
- to monitor any recovery in biodiversity following the restoration of management
- to examine plant and animal community responses following vegetation management
- to elucidate the relationship between environmental factors (e.g. hydrology) and plant communities in coastal wetlands
- to assess the impacts of climate change upon Estonian coastal wetlands

Date this report was completed: 24 November 2006

Data Collection and Results

a) Give a concise account of the data you have collected during the past field season. Data collection in 2006 continued the established experimental and monitoring protocols for plant and bird communities. For birds, this included a fifth year of monitoring, with 39 transects for breeding birds taken and 82 point counts made at eight sites to establish bird use of managed and abandoned wetlands. For plants, the vegetation disturbance experiment at Rumpo was sampled twice, amounting to 178 quadrats recorded. The 72 plant community quadrats at the well-established monitoring programmes at Hosby and Tahu were also maintained. In addition, new quadrats were set up and sampled at Hosby to assess the effects of restoration grazing and at Matsalu to record vegetation at the hydrological monitoring station. The monitoring stations themselves were repaired and/or maintained and data were downloaded at three of the four sites (the fourth was damaged by cattle). Finally, a method for sampling disturbance by wild boar was piloted for a possible new project by taking five transects through coastal wetland sites on Vormsi island.

b) What progress have you made towards achieving your original objectives? The original objectives, namely to classify coastal wetlands in relation to abandonment and identify biodiversity indicators, were a focus of the first three years of the project in the field (2002-4). Results have been reported at 21 conferences/seminars since 2002, most recently by Joyce in July 2006, and in journal papers, one of which has been published (Joyce and Burnside 2004) and two of which are currently in review (Burnside *et al.* and Scott *et al.*). Field efforts in the second phase of the project (years 4-6, 2005-7) are directed towards monitoring the recovery of biodiversity following restoration management and assessing the dynamics of coastal wetland systems, partly in relation to climate change. The second phase objectives are being achieved by continued field sampling of long-term experiments (plants and birds) and maintenance of monitoring stations to yield hydrological data, and there was a second survey this year of an additional experiment to assess the impact of disturbance on plant community dynamics.

c) Please provide a summary of your results (even if they are preliminary). Experiments running since 2003 have been used to assess the effects of abandonment on wet grassland plant community types and their biodiversity. One experiment at Hosby on Vormsi island monitors 'tall grassland', a late successional but relatively diverse vegetation type that at the study site has been encroached by Common Reed (*Phragmites australis*) due to abandonment. Results show that experimental cutting to assess restoration possibilities reduced the mean percentage cover of *P. australis* between 2003 and 2004 and then maintained the lower cover compared to unmanaged (abandoned) plots (Figure 1). It is also apparent that *P. australis* increased between 2005 and 2006, suggesting that other factors contribute to this variability such as climatic conditions in summer (e.g. it was very wet in 2005 and dry in 2006).

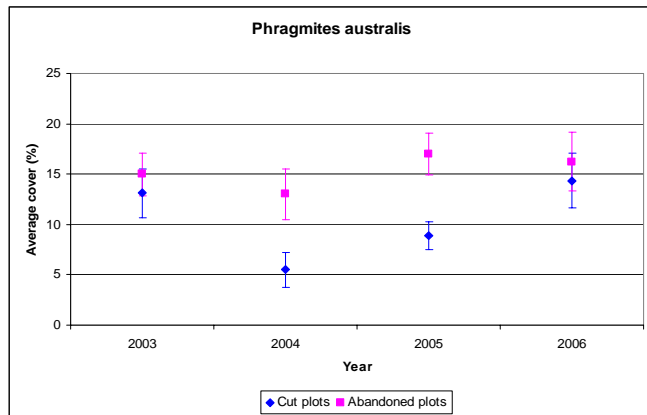


Figure 1: Mean (n=8) % cover of *Phragmites australis* in managed and unmanaged plots

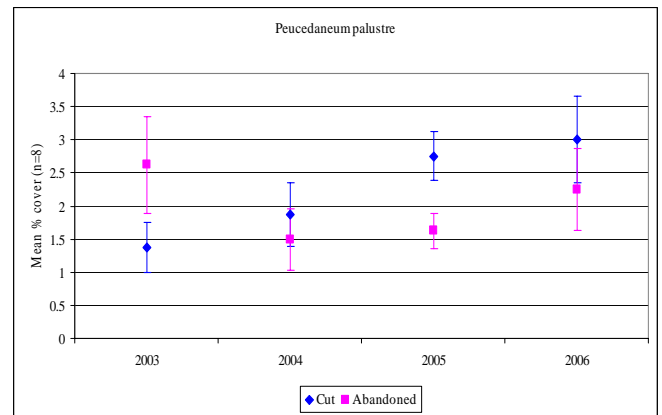


Figure 2: Mean (n=8) % cover of *Peucedanum palustre* in managed and unmanaged plots

One of the key species of tall grassland is *Peucedanum palustre* because it is an important food plant for invertebrates such as the Swallowtail butterfly. Figure 2 shows that experimental cutting has increased mean percentage cover between 2003 and 2006. In contrast, in abandoned plots the mean percentage in cut plots.

The same experimental protocol has been carried out for lower shore grassland at Hosby, as this vegetation type is a vital feeding habitat for wildfowl and wading birds. Cut plots in lower shore grassland show an increase in bare ground, where the mean cover rose from 2 % in 2003 to 13.5 % in 2006 (Figure 3). In contrast, abandonment resulted in low cover of bare ground where the grasses *Phragmites australis* and *Agrostis stolonifera* dominate the sward. Thus, reinstating cutting has had an effect in maintaining and opening the sward as well as restraining the encroachment of invasive species such as *P. australis*. Figures 3 illustrates the decrease of *P. australis* in managed plots where the mean percentage cover in 2006 was 8 %, in contrast abandoned plots (Figure 4) showed an average cover of 13 % and a strong development of *A. stolonifera*.

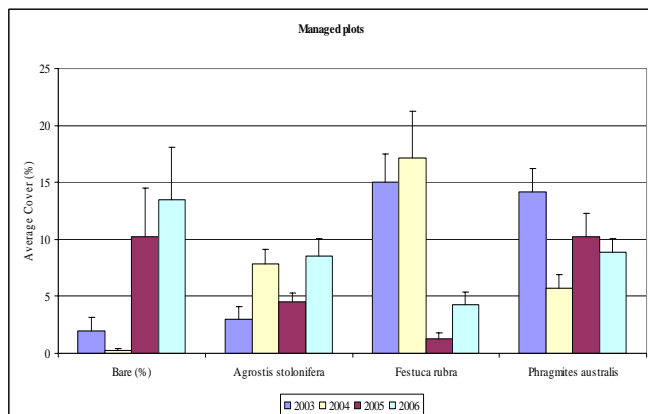


Figure 3: Mean (n=8) % cover of bare ground and grass species in managed plots

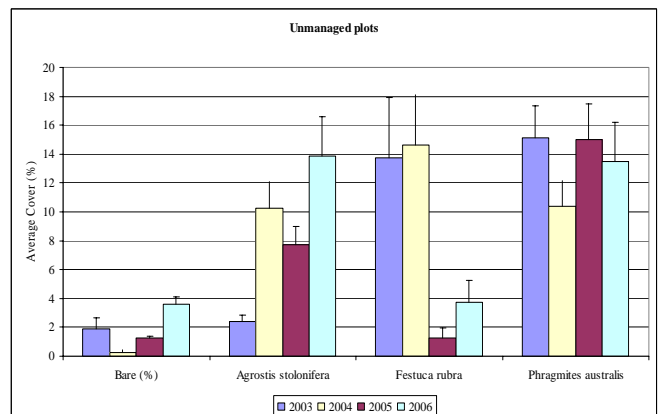
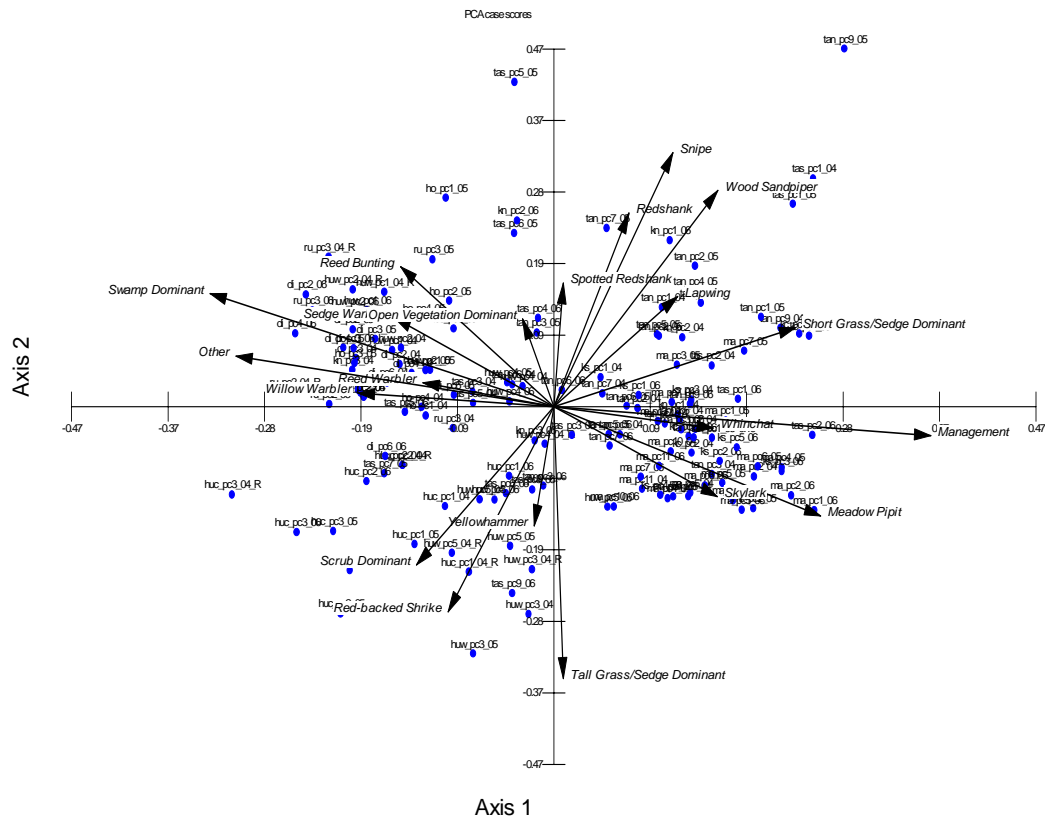


Figure 4: Mean (n=8) % cover of bare ground and grass species in unmanaged plots

Multivariate analysis of bird point count data also demonstrates the effects of abandonment upon characteristic biodiversity of wet grasslands. Figure 5 shows that wading bird species of conservation interest, such as Snipe, Redshank and Wood Sandpiper, are most closely associated with coastal wetland sites in west Estonia where short grassland is dominant (e.g. Tahu). This type of habitat, along with tall grassland, also supports typical open grassland species such as Meadow Pipit and Skylark. All of these birds are positively related to management intensity defined by grazing type and history, indicating that grazing is beneficial for many birds of conservation concern. In contrast, scrub-dominated sites such as Hullo centre are characterised by Red Backed Shrike and Yellowhammer, while swamp and mosaic wetlands typically support Reed Bunting, Reed Warbler, Sedge Warbler and Willow Warbler (Figure 5).



Vector scaling: 0.84

Figure 5: Principal Components Analysis of key bird species and vegetation composition at the west Estonian study sites 2004-6. Each dot represents one bird count.

Data from plant and bird surveys are currently being analysed for scientific papers, and postgraduate theses. Hydrological data are being compiled. Data are held within GIS databases at the University of Brighton and in Estonia. All data have been disseminated to project stakeholders by December 2006.

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 data are used within a Geographic Information System managed by Estonian stakeholders, notably NGO Läänerannik and the State Nature Conservation Centre of Hiiumägi, to plan environmental

management and monitoring locally and regionally. The research is contributing to management plans (e.g. at Mataslu), restoration management (e.g. at Hosby), and educational material (e.g. school identification sheets) in the study area. Monitoring plans will be produced by Estonian stakeholders for each study site based upon the field data collected during the Earthwatch project.

- national – The monitoring plans produced for each study site will be collated with other Estonian examples and published in a guidebook aimed at Estonian (and Baltic) scientists and practitioners (due in 2007). Earthwatch research results will be disseminated at a conference on wetland monitoring for Estonian (and Baltic) scientists and practitioners in February 2007.
- international – Published project outputs such as the monitoring guidelines and scientific publications are produced for an international audience.

b) How do your findings contribute to issues of sustainability?

Research findings are being used by key partners NGO Läänerannik and the State Nature Conservation Centre of Hiiu-Lääne to develop and implement sustainable management of the coastal wetland resource. This includes educational and profile-raising activities such as the production of wetland wildlife identification sheets for school children and encouraging land managers to visit Earthwatch field sites for demonstration purposes. Research results are also being used to inform restoration management at key sites, such as Hosby on Vormsi island.

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)
 - Burnside, N.G., Joyce, C.B., Puurmann, E. and Scott, D.M. (in review) Vegetation classification and plant indicators to assess wetland abandonment: a case study in West Estonia. Submitted to *Journal of Vegetation Science*
 - Scott, D.M., Joyce, C.B. and Burnside, N.G. (in review) The influence of landscape and habitat structure on small mammals in wetlands. Submitted to *Environmental Conservation*
 - Joyce, C.B., Phillips, J. and Burnside, N.G. (in progress) The effects of wetland grazing abandonment on bird communities
 - Burnside, N.G., Joyce, C.B. and Phillips, J. (in progress) The influence of landscape composition on breeding birds in coastal wetlands
- Management plans and reports (in progress or completed)
 - Lotman, S., Puurmann, E. and Joyce, C.B. (in progress) Monitoring plans for Rumpo, Hosby and Diby (Vormsi island), Tahu (Silma Nature Reserve) and Matsalu (Matsalu National Park). Five reports for NGO Läänerannik and the Hiiu-Lääne Region of the State Nature Conservation Centre.
- Presentations (given or planned)
 - Joyce, C.B., Burnside, N.G. and Puurmann, E. (2006) The use of vegetation classification and plant indicators to assess wetland abandonment: a study in west Estonia. Society of Wetland Scientists Annual Conference, Cairns, Australia. Lecture presentation to 50 academics and practitioners.
 - Berg, M. (2006) Management of coastal grasslands in Estonia – a plant community experiment. 14th Coastal Ecology Workshop, Wilhemshaven, Germany. Lecture presentation to 45 academics.
 - Lotman, S. (2006) Management of coastal grasslands in Estonia – a pollinator experiment. 14th Coastal Ecology Workshop, Wilhemshaven, Germany. Lecture presentation to 45 academics.

- Popular articles or films (in progress or completed)
 - Restoring wetlands (in progress). A DVD to show restoration of Estonian coastal wetlands for the European Union Life Programme, which will include Earthwatch results and interviews with volunteers and staff.

We would appreciate copies of any relevant materials you can make available to us.

SECTION II: VOLUNTEERS

Earthwatch will send Section II to the volunteers who worked on your project. It will **not** be used on the UNEP-WCMC web site.

Cover Letter to Volunteers

Please write a brief, informal, and signed letter to your volunteers. Please express your thanks, and outline news and any anecdotes.

Volunteer Tasks and Accomplishments

- a) How did the volunteers contribute ideas, skills, expertise and motivations beyond that which you anticipated?

Volunteers remained enthusiastic and motivated across a wide range of activities this year. In so doing, they showed considerable flexibility and were able to adapt to new methods or learn new skills rapidly. Volunteers in Teams I and II showed particular motivation because these teams were small and yet managed to achieve all of their objectives.

- b) How have volunteers helped you to achieve your research or educational objectives? Please give specific and quantitative measures of the volunteers' contribution to your data collection.

Volunteers participated in all aspects of the field research, including installation of equipment, maintenance of monitoring stations, pilot testing methods, data collection and quality control, and management of supporting resources. As such, they are essential to the continued progress and success of the project. Teams of volunteers, fellow, students and staff achieved the following in 2006:

- c) breeding bird surveys involving 39 transects at Vormsi island and Silma on the mainland
d) bird community surveys comprising 82 point counts at 12 sites at Vormsi, Silma and Matsalu
e) all plant species sampled in 72 permanent quadrats at long-term experiments at Hosby, Vormsi island and Tahu, Silma
f) twice sampling all species within 80 quadrats as part of a disturbance experiment at Rumpo, Vormsi (a total of 178 quadrats including replicates)
g) cutting 32 vegetation plots by hand to experimentally mimic grazing management
h) setting up and sampling 10 new vegetation monitoring quadrats at Hosby on Vormsi island and at Matsalu on the mainland
i) taking 138 environmental samples for baseline soil characteristics
j) setting and collecting insect traps at Vormsi, Silma and Matsalu
k) walking five transects to assess wild boar disturbance on wetland vegetation at Rumpo, Vormsi
l) checking, maintaining and repairing eight hydrological monitoring stations at four sites
m) repairing fences at several experimental enclosures
n) cataloguing and re-presenting almost 100 specimens for the Earthwatch field herbarium in Estonia

Project Development

- a) What logistical or scientific challenges have you encountered in the past season and how will you address them during the next field season?

The maintenance of the hydrological monitoring stations is an ongoing challenge due to damage by cattle and vandalism, and equipment not working correctly. In 2006, the two monitoring stations at Matsalu were both damaged and nearly all soil moisture loggers have suffered from poor recording. At the end of the field season, it was decided to move one of the stations at Matsalu to a more remote location and to repair the other, and this is due to be

carried out by Estonian partners by Spring 2007. The project team are also contacting other users of the soil moisture data loggers to try to overcome problems with this equipment.

Another challenge concerns the financial costs of hired transport and accommodation in Estonia, which have both risen disproportionately in relation to other costs and available funds over the past five years. However, a review of transport and accommodation costs was carried out by the PI in conjunction with Estonian partners after the 2006 field season and it is considered that the revised Earthwatch budget for 2007 should be sufficient to remain with the existing providers.

However, it should be noted that some changes in transport and/or accommodation may be required in later years to remain within the budget.

From a volunteer perspective, it was evident this year that some minor alterations to the briefing document would be beneficial, particularly regarding: a) clarification of which bus station in Tallinn serves the rendezvous site of Haapsalu, b) recognising the meeting point at Haapsalu bus station, and c) advice to bring a bath towel. These matters will be addressed when the briefing document is next revised.

b) Have you used any additional methods/strategies to meet your research objectives? If so, please describe them.

This year was largely one of consolidating and applying existing methods because there are already many research activities ongoing. Nevertheless, there was an opportunity to pilot test a new method designed to assess the impact of large mammal disturbance on vegetation in wetland landscapes. The rationale behind this is that many large mammals can influence vegetation communities and biodiversity by helping to disperse seed, creating new microhabitat through disturbance, and nutrient enrichment of soil as a consequence of faeces and urine deposition. New recording forms were produced and five transects were carried out at Vormsi island, with measures of boar nests, wallows and digs made. The data will be analysed in winter 2006/7 to ascertain whether the technique is effective. In addition, baseline surveys of invertebrates were carried out, for many sites for the first time ever, in order to add to the Earthwatch database and extend the biodiversity information available. The invertebrate protocol used standard trapping techniques but with coloured 'traps' to investigate the effectiveness of various colours for catching invertebrate groups. The invertebrates will be identified and analysed over winter 2006/7 as part of a Masters programme at Tartu University, Estonia.

c) How will you develop your research in the coming field season?

The field work will continue to service key experiments (e.g. disturbance at Rumpo, abandonment at Tahu, restoration management at Hosby) and monitoring stations (e.g. hydrological) in the coming field season, as it represents the final year of Phase II of the project. However, there is scope in 2007 to develop two key aspects for future study, both designed to maintain the project at the forefront of science and address issues of policy and academic relevance:

i) Bird surveys focussing upon assessing the effects of restoration management, which represents a shift from further baseline monitoring. The bird communities of sites and sub-sites with restoration management (i.e. reed-clearance) will be compared with 'control' (abandoned) locations, incorporating indicator species previously identified by the project, e.g. wading birds. Supporting information in the form of vegetation characteristics and environmental variables will also be collected. Bird surveys may also focus upon the habitat requirements of critical species in order to build up a GIS-based model for conservation management and restoration.

ii) The project will begin to more explicitly address the crucial issue of the impacts of climate change on coastal wetlands. In the first instance, the intention is to use a differential GPS to map the micro-topography of key wetland study sites and relate elevation to plant communities, soil and hydrological variables, and other characteristics, in order to assess

likely scenarios of vegetation change under models of Baltic sea level rise. This study builds upon our previous research because new field data will be integrated within the existing GIS and hydrological monitoring data.

Educational Opportunities

- a) Does your project directly or indirectly involve the following groups in your research topic?
- Local communities – local land owners, managers and nature reserve staff. Results are disseminated through NGO Läänerannik to stakeholders in west Estonia.
 - Students – undergraduates from Tartu University, Estonia, and the University of Brighton, UK, and a placement student from France via Matsalu National Park all participated in the project in 2006. Three post-graduate students, two studying for PhDs at the University of Brighton and one for a Masters at Tartu University, also participated throughout the field season.
 - Early career scientists – the field team includes young career scientists from Estonia and the UK.
 - Other groups – school children on Vormsi island are invited to participate in field activities and to meet the volunteers.

b) Please tell us the ways your research helps these groups better understand the conservation of a sustainable environment (see the UNESCO definition above).
The research sites are available as demonstrations for local communities to more about monitoring and sustainable management of wetlands, including their biodiversity and agricultural values. School pupils, land managers and farmers have visited the sites in the past year. The research is also being used to inform related projects (funded by the Darwin Initiative and EU Life) that implement sustainable management and monitoring at key sites, and seek to disseminate good practice guidelines for monitoring and sustainable management (via workshops, leaflets, and publications).

c) Has your project helped lead to the completion of Masters' theses, or other educational research findings?
Two PhD programmes are associated with the project in the UK and Estonia, and one Masters thesis in Estonia. Two undergraduate dissertations were completed this year based upon field work undertaken by the students in 2005, while another dissertation will be submitted in 2007 following field work in Estonia this year. The Earthwatch database has been used to inform wetland wildlife identification sheets produced by NGO Läänerannik for school children. The Earthwatch field methods were used by one volunteer (Teaching Fellow Lisa Evans) to form a lesson for 3rd-5th grade students on return to the USA (Appendix 1).

Partnerships

- a) List partnerships or collaborations with other organizations that you have developed or maintained in the past season.

NGO Läänerannik, Estonia

Silma nature reserve, Estonia

Matsalu national park, Estonia

State Nature Conservation Centre of Hiiu-Lääne, Estonia

Kumari travel, Estonia

Estonian Society for the Protection of Semi-natural Communities (ESPSC)

Baltic Environmental Forum (BEF)

University of Tartu, Estonia

University of Tallinn, Estonia

University of Kiel, Germany

Coastal Ecology Study Group

b) How have these organizations contributed to your project objectives?

NGO Läänerannik and the State Nature Conservation Centre of Hiiu-Lääne are key partners providing scientific, management and logistical advice and support. The staff at Silma nature reserve and Matsalu national park provides technical and logistical support at these two important study areas. Kumari travel are a sustainable travel company who provide educational tours for volunteers as optional activities during field work. The ESPSC provide background information on management of Estonian study areas. The BEF have provided advice on monitoring coastal wetlands and useful contacts from a wider Baltic perspective. The University of Tartu are partners in an EU Socrates student exchange programme, and students from the University of Tallinn have also participated on the Earthwatch project. The University of Kiel and the Coastal Ecology Study Group provide academic support and networking.

c) How do you anticipate these organizations will use the results generated by the project, and in what timeframes?

NGO Läänerannik and the State Nature Conservation Centre of Hiiu-Lääne share all data, including the GIS, and use them constantly to underpin their conservation, education and sustainable management activities in west Estonia, including at Vormis island, Silma nature reserve and Matsalu national park. Kumari travel liaises with the above organisations to develop sustainable tourism. ESPSC also have access to all data in order to develop their management plans for semi-natural grasslands in Estonia. The BEF have used information from the project to develop monitoring strategies for Baltic grasslands protected by the European Union. The Universities of Tartu, Tallinn and Kiel, and the Coastal Ecology Study Group, will use the results of the project over the next two years to inform their own research, including possible collaborations with Earthwatch project stakeholders.

Acknowledgements

It is a testament to the motivation and determination of the volunteers that, although they were fewer in number than in previous years, the research objectives for this year were successfully met, with plenty of fun along the way! Amongst the staff, Silvia Lotman and Maureen Berg planned and organised field logistics with great care and detail, Elle Puurmann and Meelis Magi of NGO Läänerannik provided strategic support, and Niall Burnside went beyond the call of duty in July! Thanks to all of you. The project this year was not only financially supported by the Earthwatch Institute but also by HSBC, BAT, the Boston Teachers Fund, the University of Brighton and the Darwin Initiative.