

The last year has started!

By Rob Jongman

EBONE has come into its fourth year. In the previous year a lot has been done. The latest version of the handbook has been published, the data from the field work have been included in the database and the analysis is starting. Our database is functional and data from different sources can be integrated. We now have a system that can integrate data from different countries in an INSPIRE format. The result has been included in the work of the INSPIRE TWG Species, Habitats and Biogeographic regions. The summer of 2011 will be used for further testing and meta data will be available in autumn. We will also show the data in a public version through a map viewer; the exact details should be further elaborated and all rules on data sharing should be obeyed.

We now started with the final product: the report on "a fully integrated system based on key biodiversity indicators that can be implemented within an institutional framework operating at the European level." This report will include the results of the project and provide guidelines for work in the future. It will indicate how a sampling design for Europe should look like, what the estimated efforts are and how monitoring can be organised.

The EBONE consortium has been active in publicising its results and its knowledge. We have been contributing to 22 published papers of which ten in peer reviewed journals. Especially important was the GEO

BON meeting for assessing the observation capabilities for the targets of the CBD for 2020, the AICHI targets, that was a cooperative action by the Dutch Ministry of Economic Affairs, Agriculture and Innovation and EBONE. The report can be downloaded from the EBONE website (<http://www.ebone.wur.nl/UK/Publications/>).

We recently visited DG Environment in Brussels and our hosts agreed that the system that we have developed is superior to what exists now. However, one bottleneck is still convincing individual countries why they should change their methods except for that it is much faster and cheaper than traditional systems. Changing monitoring systems is not an easy process. However Israel and Switzerland will now start to use the system. They have all advantages of using our database, software and tested methods. We will to continue to elaborate how to convince other EU member states. One action already planned is for us to go and visit European and national institutions to present our results and show them how international cooperation make it easier, cheaper and better. We hope to see many of our readers in person there. We also might meet at the IALE congress in Beijing, the congress of the European Ecological Federation in Ávila, Spain or at the GEO general assembly in Istanbul in November 2012.

Looking forward sharing the results of EBONE!

Contents

The last year has started!	1
Updates from the workpackages	2
WP1: Institutional organisation of Biodiversity observation	2
WP6: Quality check control	4
WP9: South Africa: Deriving biodiversity information from Landsat and SPOT 5 data	4
Presentation of the partners	6
The Centre for Ecology & Hydrology (CEH)	6
The Estonian University of Life Sciences (EMU)	7
Project meeting in Tartu	8
Forthcoming conferences and events	9

Updates from the Work Packages

WP1 **Institutional organisation of Biodiversity observation (D1.3)**

By Rob Jongman

Europe is complex organised when it comes to biodiversity monitoring. Different countries have developed different structures to enhance networking, sharing knowledge and infrastructures. However, data discovery and data collection is not the highest priority in most countries. This is a strange thing as knowledge is based on data. GBIF concludes in its state of the art report that there is a lack policy on metadata cataloguing across their network and they do not have a publishing strategy and action plans. However, for an integration of biodiversity data in the mainstream of environmental information systems this is essential as it is for reporting on policy and the use of funds for implementing policies. The data quality assessment report on the Habitats Directive reporting by the European Topic Centre on Biological Diversity in 2009 confirm the little interest of countries in the data on their biodiversity.

To bring together the different dimensions of biodiversity monitoring specifically for policy-relevant work the approach has to take into account different institutionally related challenges:

- Identification and accessibility of knowledge and expertise in a timely and flexible manner;
- An open network-process and taking into account all knowledge developed in the field;
- Acknowledgement of primary data providers, collators and synthesizers of knowledge;
- Applying correctly rules and legal issues on data ownership confidentiality and intellectual property rights.

The main aim of this part of EBONE is to outline an institutional framework for a European Biodiversity Observation Network. The consequences of these guiding principles

is that there is a need for coordination and cooperation between European agencies, national and regional authorities, conservation agencies, data collecting NGO's and national data portals. Methods applied in different countries and by different agencies and NGO's will have to be compared and studies have to be carried out for harmonisation. This has to be done for earth observation data, habitat data as well as for species data.

Within Europe the responsibility for implementing of and reporting on biodiversity policy is with the national and regional governments. Within the EU there are six decentralised or federal member states (Spain, Italy, Austria, Belgium, Germany and the UK) in which the official responsibility for biodiversity policy is at the regional level. This includes in total 70 regions. In the other 21 member states the implementing and reporting responsibility is officially with the national government, but in practice many implementation tasks are decentralised also there. That means within the European Union there are over 90 users of biodiversity information but in fact there will be more.

The data providers are even more dispersed. They are partly organised nationally such as in the Czech Republic and Slovenia or through regional agencies as in Germany, Spain and Belgium. In the Netherlands vegetation and habitat data are monitored by the 12 provinces and about ten NGOs.

Beside the national and regional agencies it can also be that national biodiversity data are collected by universities (Northern Ireland, Sweden) and in many cases NGO's collect data on special species groups. In Europe there are many volunteer groups specialising on monitoring species. The largest is Birdlife International as a global umbrella organisation of national organisations and a number of global bird monitoring programmes (seabirds, flyways).

An institutional framework for monitoring in Europe has to be based on this existing rather complex situation. As described above, there are existing interests in parts of Europe

through data collecting NGOs such as Birdlife International and Wetlands international and the British Bat Conservation Trust (BCT), functioning agencies and services such as the different national forest monitoring programmes and regional and national agencies. Next to these other sources of information also exist that should be included such as citizen science.

Regional Biodiversity Observation Networks (BONs) focus on a particular geographic region and mostly emerge on their own through regional interest, organization, and support. Regional BON's can be national, link groups in several countries or may even be restricted to a part of a country. CMBP is the circumpolar BON, linking monitoring in the countries around the polar circle (<http://www.caff.is>).

There are a number of benefits to having national BONs as a network of existing systems or organizations, established under the auspices of the appropriate government agencies. In Europe there are several countries in which the subnational administrations have the main responsibilities. Therefore it must be recognised that each community operates best in a manner consistent with its culture.

Recommendation 1: National and subnational initiatives, national and topical data coordination are the driving factors in data providing. This will not be sufficient to address European interests as there are common European tasks and obligations such as reporting for the European Directives. European obligations require European cooperation.

Recommendation 2: There is a need for a more formal European level GEO BON Network to establish European standards, harmonise data collection and for sharing knowledge. A European BON (EURO BON) can help to provide harmonised data for BISE, save costs for data collection and give Europe a better profile in the world as the continent with high level biodiversity data.

Recommendation 3: There is a need to establish formal national level Biodiversity Observation Networks. Implementation of standardized monitoring protocols will depend upon identification of relatively inexpensive, repeatable protocols that can be implemented in all Europe by applying common tools and databases that are shared or are built on an exchangeable structure. National BONs can have different compositions in different countries, varying from state organisations to networks of institutes and universities.



Euphorbia characias, Peleponnesos



Slovenia

WP6 **Quality check control**

By Philip Roche

As part of the WP6, a quality control operation was organized during the summer 2010. The quality control team consisted of the following persons: Bob Bunce (Alterra), Philip Roche (Cemagref), Geert de Blust (INBO), Ilse Geijzendorffer (Alterra) and Rob Jongman (Alterra). The priority of the control was to cover GHCs and the use of qualifiers in determining boundaries of areal and linear features. The selection of the squares to be visited was done by visited field team with particular emphasis on squares where recording problems have been encountered. The objective was to do 2 squares a day and to have at least 2 days in the field. Nine countries (Austria, Estonia, France, Greece, Norway, Portugal, Romania, Slovakia and Spain) and 34 squares have been visited.

Based on scans of the maps and aerial photographs sent previously and control in field, the boundaries of elements were checked if they were in the right place. In the quality check the identification of boundaries was interpreted in a broad sense: position (displace it), significance (keep it or not) and absence (to be added).

The quality control exercise showed up that predominantly the recording between the countries was consistent and would lead at the project scale to a coherent dataset, but also that many of the problems encountered by the field team were linked to interpretation of the handbook. This quality control exercise put also in evidence that longer training course should be organized and preferably in different countries in order to handle local difficulties and specificities.

Following the quality control reporting, a number of additional qualifiers were proposed and were added to the handbook (i.e. the global qualifier "COM" – complex of patches – for areas encompassing many small patches below the 400m² limit to be considered a areal element.) Additional attention have to be paid to the scale of the aerial photograph used since large scale maps tend to lead to mapping patches below 400 m² and small scale maps induced omission of patches. A revised version of the field handbook was produced and a digitizing protocol sorted out in order to improve the quality of the element delineation phase.

Thanks to the field teams that welcomed the quality control team members and allowed this exercise to be a strong moment in the EBONE project.

WP9 **South Africa: Deriving biodiversity information from Landsat and SPOT 5 data**

By Melanie Lück-Vogel

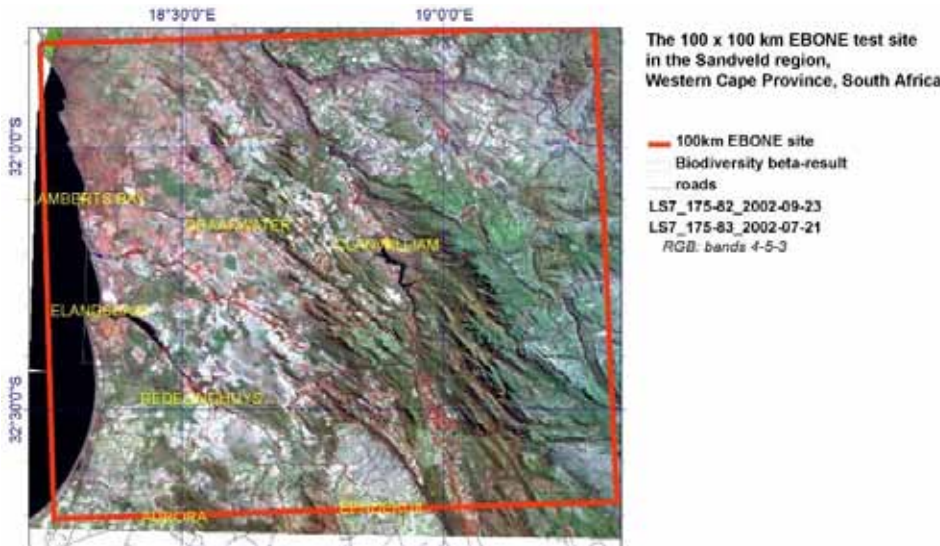
The aim of the EBONE project is the development of a biodiversity monitoring system for Europe. The aim of the testing in non-European countries besides the technical



feasibility also includes the exploration of the respective conservation contexts. Can the monitoring system developed by EBONE be successfully implemented for conservation demands in countries without already existing EBONE databases? The technical feasibility of the method has been tested by INPA (Israel Nature and National Parks Authority) on about nineteen 1km Mediterranean and Desert squares in Israel (see EBONE Newsletter from December 2010) and on 6 Mediterranean sites in the Sandveld region by CSIR (Council for Scientific and Industrial Research) in South Africa. The applicability for those non-European regions has been proven, even if some modifications in the EBONE key had to be applied to accommodate some plant life forms which do not occur in Europe.

However, first discussions with stakeholders and researchers in South Africa revealed a slight reservation for the approach given its labour-intensive field work and habitat classification component. One reason is the sheer size of the country, covering an area greater than Germany and France together:

Besides the vast size of the country the highly diverse vegetation entails 2 World Floral Kingdoms, 9 biomes



(bioclimatic strata) and 427 vegetation units (Mucina et al. 2005). The assessment and monitoring of this diverse environment using the EBONE system at a scale relevant to national, provincial or local levels might exceed the capacity and capability of the responsible conservation entities.

Therefore CSIR currently explores an alternative approach which is based on species numbers derived from field observations and/or existing data bases (SANBI, GBIF, SAEON etc.) and medium resolution remote sensing (RS) data. The idea is that biophysical landscape characteristics which can be derived from medium resolution RS data in terms of spectral and structural information can be used as a proxy for habitat/ecosystem properties and thus as proxy for biodiversity in terms of species numbers or 'biodiversity intactness'. The characteristics we are currently testing are brightness (albedo), NDVI, the compactness of landscape segments (derived using eCognition) and the Standard deviation in the NIR band per landscape segment as is also being tested in Europe. The suggested alternative approach is expected to do largely without time- and labour intense field work and to be applicable for monitoring of large and otherwise inaccessible areas. In the current phase of development no a priori generation of habitat keys is necessary.

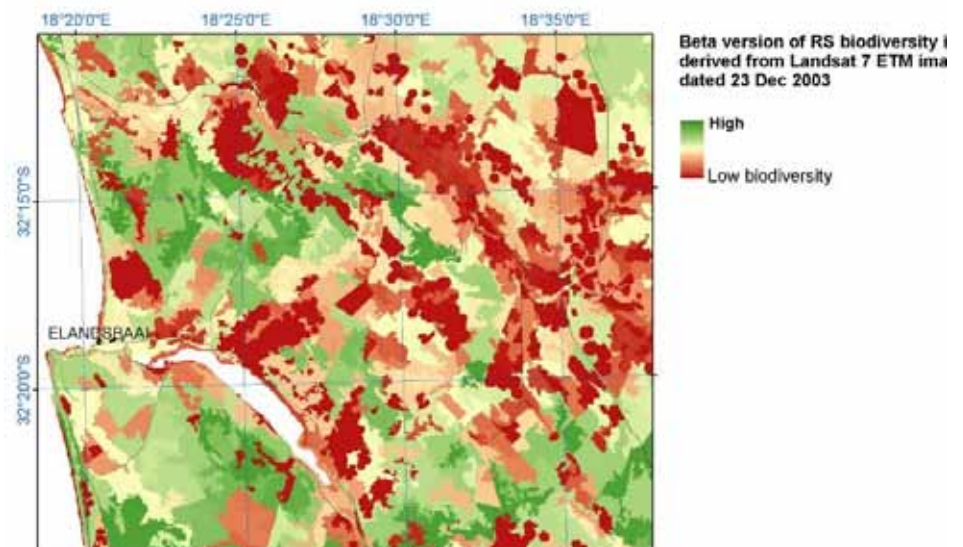
However, the use of existing national classification systems such as the Vegetation Map by Mucina et al. (2005) and the National Land Cover 2000 map (van den Berg et al, 2008) for stratifying and interpreting the RS results at a later stage are an option to be explored. The envisaged advantage of the approach would be an easier, faster monitoring and identification of hot spots of change (which might then need a more intense assessment in the field) over large areas even with limited ground information available.

Beta version results for the major part of the

region were derived from Landsat 5 and 7 (E)TM images (30m resolution) from various acquisition dates as well as a single date results derived from a SPOT 5 image (10 m resolution) for a subset of the region are already available. The validation of the results is currently under way, and results are to be expected within the next 1-2 months. Information on the time and costs implied by this approach as well as the feedback from the relevant national stakeholders will be feedback to the EBONE WP8. It is important to explore RS approaches in order to discuss the advantages and disadvantages of them in terms of applicability under different site conditions, budget, time and trained staff available in the respective application context. As study region for both the test for the applicability of the general EBONE approach and the South African RS approach the Sandveld region in the South African Western Cape Province was selected.

References:

Mucina, L., Rutherford, MC (2006). The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria, 816 pages.
 Van den Berg, E.C., Plarre, C., Van den Berg, H.M. & Thompson, M.W. (2008). The South African National Land Cover 2000. Agricultural Research Council-Institute for Soil, Climate and Water. Pretoria. (CSIR Report No. GW/A/2008/86).



Presentation of the partners

The Centre for Ecology & Hydrology (CEH)

The Centre for Ecology & Hydrology (www.ceh.ac.uk) is the UK's centre for integrated research in terrestrial and freshwater ecosystems and their interaction with the atmosphere. As part of the UK's Natural Environment Research Council, we provide National Capability based on innovative, independent and interdisciplinary science and long-term environmental monitoring. CEH has over 400 scientific staff at 4 sites across the UK. It works in partnership with the academic research community, policy-makers, industry and society to deliver world-class solutions to the most complex environmental challenges facing humankind.

Research Themes relevant to EBONE
CEH research is delivered through three interdependent Science Programmes covering Biodiversity, Biogeochemistry and Water. These programmes are underpinned by the Environmental Information Data Centre (EIDC), the main purpose of which is to support integrated environmental research by optimising the availability of our data and information to the whole scientific community.

Much of the work in the Biodiversity Programme is closely aligned to the objectives of EBONE. In particular, research and development on biodiversity observations, patterns and forecasting aims to:

- undertake long-term monitoring to detect and attribute the causes of environmental change;
- improve informatics capability for data collection and integration to interpret patterns of biodiversity;
- develop new methods and systems to assess changes in the abundance and distribution of biodiversity, from genes to ecosystems; and
- quantify and model interactions between biodiversity and environmental change.

Through this and other work, CEH is responsible for some of the UK's most important long-term, large-scale biodiversity related databases including Countryside Survey, UK Environmental Change Network, Biological Records Centre, Butterfly Monitoring Network, UK Phenology Network and NERC Environmental Bioinformatics Centre. These

(and other datasets) form a loosely integrated system operating at different levels of scale and coverage (see figure) that is designed to provide quality assured data to detect environmental change and interpret its causes and consequences. Many of these data can now be viewed and accessed through CEH's Information Gateway (CIG) <http://www.ceh.ac.uk/CEHInformationGateway.html>. The CIG enables researchers and others to search the data catalogue, read descriptions of the nature and scope of datasets found, overlay maps of key spatial datasets and download key datasets (subject to terms and conditions of use).

CEH's observation capability is supported by remote sensing research. Our aim is to transform remotely sensed spatial data to quantitative and qualitative information which can be used as a vehicle for integrating observations, models and theories acquired and developed across CEH's core science areas (biodiversity, biogeochemistry and water). Our priority research for Earth Observation covers themes on land cover, landscapes and habitats, vegetation

phenology, land surface processes, and diseases and pests and aims to investigate, test and implement methods for integrating observations (in situ and remotely sensed) and models; and to quantify, detect and attribute changes and trends, including the development of EO derived indicators for habitat quality, ecosystem services and climate change.

CEH has been involved in many international and European projects related to biodiversity including BioAssess, BIOPRESS, GEOLAND, BioPLATFORM, ALARM, DAISIE, SENSOR, and AlterNet. It has also played a role in the development of international components of observing systems through projects and programmes such as LTER-Europe, the International Long-term Ecological Research Network (ILTER), Lifewatch, the Global Biodiversity Observation Network (GEO BON) and, of course, EBONE. In EBONE CEH is leading the WPs on (i) the development of the conceptual framework, including the assessment of biodiversity observations and indicators for use in EBONE and (ii) the intercalibration of EO data and in situ data.

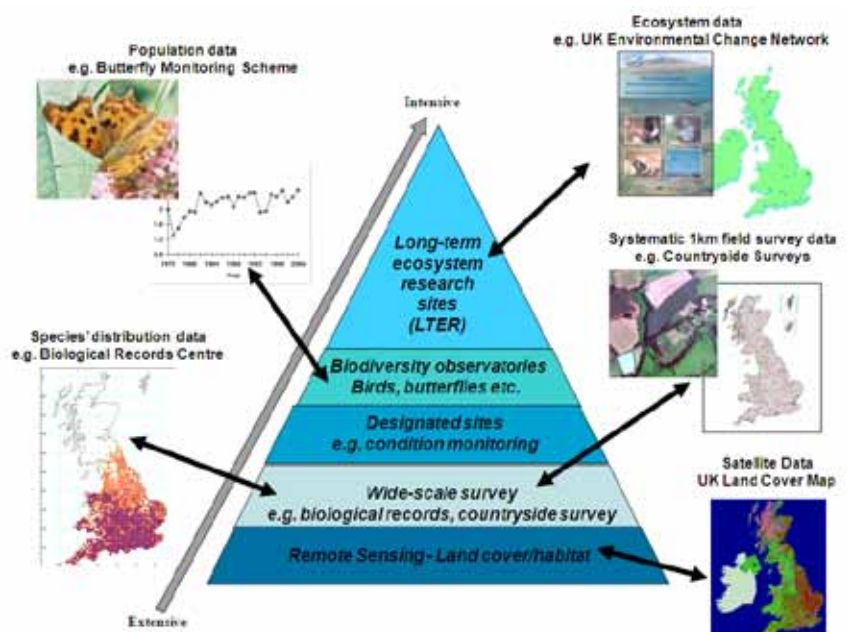


Figure 1. Key CEH data sets in the UK biodiversity and ecosystem observation system.

Policy relevance and applications

CEH's biodiversity and ecosystem observations and related research underpin key components of the knowledge required to support UK environmental policy. Recent applications have included: carbon inventories; the detection of climate change impacts on biodiversity; Countryside Survey 2007, countryside quality counts and indicators; the UK's National Ecosystem Assessment; valuation of biodiversity and ecosystem services; the assessment of drivers of change on key ecosystem servi-

ces; the Insect Pollinators Initiative (which is designed to address the alarming decline in pollinators observed in the UK); and the development and use of participatory approaches (citizen science) for observing environmental change and raising public awareness. Many of these applications will be relevant to the recently published (2011) Environment White paper on "The Natural Choice: securing the value of nature" which sets out the Government's plan for, amongst other things, improving the quality and increasing the value of the natural environment across England and abroad.

Associated with this White Paper, CEH is now working closely with Government Departments and Agencies to provide a more tightly integrated and cost-effective approach to monitoring change in the countryside which incorporates *is situ*, remotely sensed and citizen based observation programmes. It is already recognised that such an approach should align with similar initiatives across Europe and Globally that are being championed by EBONE.

The Estonian University of Life Sciences (EMU)

The Estonian University of Life Sciences (EMU) is the only university in Estonia whose priorities in academic and research activities provide the sustainable development of natural resources necessary for the existence of Human Society as well as the preservation of heritage and habitat.

Since 2005 the Estonian Agricultural University has been called The Estonian University of Life Sciences. After reform teaching and research is carried out in five institutes:

Institute of Agricultural and Environmental Sciences, Institute of Veterinary Medicine and Animal Sciences, Institute of Forestry and Rural Engineering, Institute of Technology and

Institute of Economics and Social Sciences. The roles of the Estonian University of Life Sciences are to undertake internationally acknowledged science and research, to carry out innovative activities, to provide science based academic education and promote life-long learning. The Estonian University of Life Sciences is the centre for research and development in such fields as agriculture, forestry, animal science, veterinary science, rural life and economy, food science and environmentally friendly technologies.

The EMU is involved in EBONE through the Institute of Agricultural and Environmental Sciences (IAES).

The Institute of Agricultural and Environmental Sciences at the Estonian University of Life Sciences is a leading institution for research, survey, monitoring, teaching and training in the spatial and landscape planning, agricultural and environmental sciences, freshwater ecology in the Baltic Region. It currently employs around 350 staff in total.

The Institute is responsible for training more than 700 undergraduate and about 350 graduate students, including 90 PhD students.

The IAES monitors and organises studies of the following disciplines: horticulture, agronomy, production and marketing of



Estonian University of Life Sciences.



Main building and Student hostel.

agricultural products, applied hydrology, nature tourism (commenced in 2006), landscape conservation and maintenance, ornamental gardening (2007) and landscape architecture. The following disciplines can be acquired by distance learning: management of urban, nature tourism and industrial landscapes (2006) and the management of agricultural companies (2007). EMU currently has three international Master programs – “Management of biodiversity and multifunctional ecosystems”, “Applied Plant Biology”, „Landscape Architecture“– all of them are taught by IAES.

Research groups at the Institute of Agricultural and Environmental Sciences participate in a number of projects funded by the European Union Sixth Framework Programme (FP6) and Seventh Framework Programme (FP7) (for example EUMON, BIOPLATFORM, AlterNet, AEMBAC, GEM-CON-BIO UNWIRE) and other international programmes. Participation has resulted in fruitful collaboration with other groups in most European countries as well in the USA. IAES also actively promotes organizational co-operations with local entrepreneurs and business institutions in any area where mutual

cooperation is possible. One of the aims of IAES is to make research know-how and inventions / innovations more publicly accessible. Society oriented knowledge and technology in strategic areas enables the Institute to be a key partner for the Ministry of Education and Research, the Ministry of Agriculture, the Ministry of the Environment, Estonian Biofuels Association, Estonian Berry Growers Union, etc.

Project meeting in Tartu

The 6th EBONE General Assembly was held from 3 to 5 May 2011 in Tartu at the Dorbat Conference Centre. The meeting was organized by the Estonian University of Life Sciences. The General Assembly reviewed and discussed reports of work packages from 5 to 10 and concluded that all those packages had a good progress during the last period. Preceding the General Assembly three working sessions of work packages 5; WP 3/8; and WP 6/7/9 were organized. Prof Rob Jongman concluded “For the next year EBONE has to finish up: the remote sensing tasks, integrating field data, finalizing the database and report on the cost effectiveness. All deliverables should be ready in 2011. In 2012 the final conference is planned in Brussels”.

The Estonian University of Life Sciences organized pre-seminar field studies at the coastal area of Lahemaa National Park. Bob Bunce, Geert de Blust, Philip Roche, Valdo Kuusemets, and Kalev Sepp visited several Annex 1 Habitat types at coastal zone and raised bog. Experts discussed possibilities to delineate Annex 1 habitats on highly mosaic landscape. Several maps of General Habitat Category were compiled by Bob at pilot areas. A fruitful meeting with staff members of the Environmental Board took place at the Visitor Centre.



Forthcoming conferences and events

12th European Ecological Federation Congress

Date: 25 to 29 September 2011

Place: Avila, Spain

Further information: <http://www.eefcongress2011.eu/>

The 8th IALE World Congress

Date: 18 to 23 August, 2011

Place: Beijing, China

Further information: <http://www.iale2011.org/page.asp?id=109/>

XVIII International Botanical Congress

Date: 23 to 30 July 2011

Place: Melbourne, Australia

Further information: <http://www.abc2011.com/>

WP9 International workshop

Date: 10 to 12 January 2012

Place: Ein Gedi Oasis, Israel

Further information: http://www.ebone.wur.nl/UK/newsagenda/agenda/WP9_International_Workshop.htm

EBONE final conference

Date: 12-13 of March 2012

Place: Brussels, Belgium

Further information: http://www.ebone.wur.nl/UK/newsagenda/agenda/EBONE_Final_Conference.htm

Planet Under Pressure: New knowledge towards solutions

Date: 26-29 of March 2012

Place: London, United Kingdom

Further information: <http://www.planetunderpressure2012.net/index.asp>

Editorial

Responsible: Marion Bogers, Jana Špulerová, Luboš Halada

More information: www.ebone.wur.nl

This publication has been funded under the EU 7th Framework Programme for Research, Theme 6, Environment, Topic 4.1.1.2. Contribution to a global biodiversity observation system (European Commission, DG Research, Project 21322). Its content does not represent the official position of the European Commission and is entirely under the responsibility of the authors.