Deliverable A5_5.2_CNR_IBAF
"Report on field Activity, data harmonisation and sampling coordination"

Dissemination Level	Internal
Due date of Delivery	31/12/2011
Finalisation	31/12/2011
Revision number 1	30/06/2012
Document type and Version	Deliverable
Responsible	Giorgio Matteucci, CNR IBAF
Author	Giorgio Matteucci, Marco Bascietto
Language	English

Content

Annex 1 to 4: Parameters to be measured during the 2012 EnvEurope campaign at Terrestrial, River, Lake and Marine sites with comments and details

Introduction

Action 5 represents the experimental phase of the project, based on the sampling in the field of the new and pre-existing parameters and indicators at different level/scales of investigation, at EnvEurope sites, with specific monitoring intensities and with methods adjusted to the respective intensity of survey.

The results coming from the interactions with Actions A1 and A2 will allow to assess the parameters and the methods during the Action 5 "Testing in the Field" campaigns. The results of A5 will then feedback A1 (new data), A2 (parameters and method consistency), A3 (new data and spatial elaboration) and A4 (e.g.: suitability of certain parameter methodologies to particular ecosystem types, their relevance, findings).

Besides ABs, Third Parties, directly managing relevant national LTER sites, are involved in most countries using the budget allocated for External Assistance/subcontracts. Their involvement is not only connected to the "experimental phase" but also to contribution for parameters and method review and elaboration, as well as metadata and data provision.

Action 5 aims at assess the state of European ecosystems monitored at the EnvEurope sites for a set of commonly established parameters. Some of the parameters are specific for the site type (e.g. terrestrial or marine). Nevertheless, the originality and strength of the project lies in the fact that some parameters are crosscutting among site types (e.g. meteorology, substrate chemistry, habitat structure, phenological cycle, plant and animal species, primary productivity), forming a common base for comparison and evaluation. Action 5 has a view to contribute, in cooperation with other project's actions, to a better assessment of European environmental quality, contributing to the Global Monitoring for Environment and Security (GMES) initiative of the European Union by, e.g., providing ground-truth data for remote sensing of ecosystem structure, status and productivity.

The Action will be performed by field sampling and measurements on a set of common parameters related to indicators, as developed within Action 2 and relevant for Action 3. Depending on parameters and indicators is expected that each site will need, on the average, 3 to 6 visits. Some of the parameters will be collected automatically and continuously by installed instrumentation. Data and metadata will be prepared and submitted according to "standards" decided within Action 1, using, when possible, web-based tools.

Participating sites

The current LTER Europe network consists of ca. 400 sites across 17 European countries, organised in national networks, with their own governance structures, sharing the objectives of LTER-Europe. The network includes a large variety of ecosystem types, including terrestrial and aquatic (freshwater, transitional and marine) sites but, as already mentioned, is not yet harmonised at the European level.

EnvEurope operates on a selection of 20% ca. of the total LTER Europe sites, aiming at working on a sub-set of sites representing key-examples of ecological, geographical and ecosystem variability across Europe. Some sites are under the direct responsibility and coordination of EnvEurope ABs, others are managed by Third parties (involved as External assistance), always belonging to the national LTER networks of the EnvEurope ABs.
The list of sites finally selected for the testing phase is reported in table 1a and 1b, along with their involvment in the LTER network and in the EnvEurope field campaigns in 2011 and 2012.
The slight differences of table 1a and 1b from the list of sites finalised by Action 1 are related to the following reasons:
- in case of complex sites, with more than one ecosystems, it was allowed to select one of the sites for the "testing in the field" activities. This was the case of site RO01 Bucegi P. Craiului NP that selected the forest site (table 1a) and for the Spanish site of Donana, that selected the lacustrine and terrestrial system but not the coastal (table 1b);
- the site PL01 Karkonoski NP was substituted by the site PL Slowinski NP (table 1.b).

Site Name	Country	Ecosystem domain	Active in 2011 (LTER)	EnvEurope in 2011	EnvEurope in 2012
04 LTER Lunz	Austria	Lacustrine	X		X
AU01 Zöbelboden	Austria	Terrestrial (simple) - Forest	X	X	X
AU02 BFW1	Austria	Terrestrial (simple) - Forest	X	X	X
AU03 BFW2	Austria	Terrestrial (simple) - Forest	X	X	X
04 Mesta	Bulgaria	Lacustrine	X		X
06 Sozopol-Black Sea	Bulgaria	Marine	X		X
BG01 Srebarna	Bulgaria	Terrestrial (complex)	X		X
BG02 Petrohan	Bulgaria	Terrestrial (simple) - Forest	X		X
BG03 Yundola	Bulgaria	Terrestrial (simple) - Forest	X		X
02 Lake Paijanne	Finland	Lacustrine	X	X	X
09 Zingst	Germany	Marine	X		X
05 Uckermark	Germany	Terrestrial (complex)	X		X
06 Rhein Main Observ	Germany	Terrestrial (complex)	X	X	X
07 Eifel	Germany	Terrestrial (complex)	X		X
DE-01-LH-FB Friedeburg	Germany	Terrestrial (complex)	X	X	X
DE-01-LH-GH Greifenhagen	Germany	Terrestrial (complex)	X	X	X
DE-01-LH-SS Schafstädt	Germany	Terrestrial (complex)	X	X	X
DE-01-LH-WL Wanzleben	Germany	Terrestrial (complex)	X	X	X
DE01 Bornhoved	Germany	Terrestrial (simple) - Forest	X		X
02 Lake Balaton	Hungary	Lacustrine	X		X
03 Kiskun	Hungary	Lacustrine	X		X
03 Kiskun	Hungary	Terrestrial (complex)	X	X	X
04 Sikfökút	Hungary	Terrestrial (simple) - Forest	X	X	X
08 Southern Alpine Lakes	Italy	Lacustrine	X	X	X
09 Lentic Env. Apennines	Italy	Lacustrine	X		X
10 Lake Sardinia	Italy	Lacustrine	X		X
11 North Adriatic Sea	Italy	Marine	X	X	X
12 Gulf of Naples	Italy	Marine	X		X
15 Lagoon of Venice	Italy	Marine	X		X
IT01 Apennines high elevation	Italy	Terrestrial (simple) - Alpine	X		X

Table 1a. List of the EnvEurope sites with involvement in EnvEurope campaigns (2011 and 2012).

Site Name	Country	Ecosystem domain	Active in 2011 (LTER)	EnvEurope in 2011	EnvEurope in 2012
IT06 Coastal Dunes	Italy	Terrestrial (simple) - Coastal	X		X
IT02 Forests of Alps	Italy	Terrestrial (simple) - Forest	X	X	X
IT03 Forests of Apennines	Italy	Terrestrial (simple) - Forest	X	X	X
IT04 Mediterranean Forests	Italy	Terrestrial (simple) - Forest	X	X	X
IT05 Lowland forests	Italy	Terrestrial (simple) - Forest	X	X	X
LT-01 Aukstaitija	Lithuania	Terrestrial (complex)	X	X	X
LT-03 Zemaitija	Lithuania	Terrestrial (complex)	X	X	X
LT-04 Nagliai, Curonian Spit NP	Lithuania	Terrestrial (simple) - Coastal	X		X
01 The Sulejowski Reservoir	Poland	Lacustrine	X	X	X
20 Lake Mikołajskie	Poland	Lacustrine	X	X	X
27 West Polesie BR	Poland	Lacustrine	X	X	X
15 Brenna	Poland	Terrestrial (complex)	X	X	X
27 West Polesie BR	Poland	Terrestrial (complex)	X		X
PL Slowinski NP	Poland	Terrestrial (simple) - Forest	X		X
PL05 Tatrzański NP	Poland	Terrestrial (simple) - Forest	X	X	X
PL17 Kampinoski NP	Poland	Terrestrial (complex) - Forest	X	X	X
PL18 Primaeval Bialowieza Forest	Poland	Terrestrial (complex) - Forest	X	X	X
01 Braila Islands	Romania	Lacustrine	X	X	X
01 Braila Islands	Romania	Terrestrial (complex)	X	X	X
02 Neajlov Basin	Romania	Lacustrine	X		X
02 Neajlov Basin	Romania	Terrestrial (complex)	X		X
RO01 Bucegi P. Craiului NP	Romania	Terrestrial (simple) - Forest	X	X	X
01 Donana	Spain	Lacustrine	X	X	X
01 Donana	Spain	Terrestrial (complex)	X	X	X
Ordesa y Monte Perdido	Spain	Terrestrial (simple) - Alpine	X		X
SP02 Sierra Nevada	Spain	Terrestrial (simple) - Alpine	X		X
SP06 Colserolla	Spain	Terrestrial (simple) - Forest	X		X
SE01 Northern coniferous forest	Sweden	Terrestrial (simple) - Forest	X	X	X
SE02 Central Swedish uplands spruce forest	Sweden	Terrestrial (simple) - Forest	X	X	X
SE03 South Swedish uplands spruce forest	Sweden	Terrestrial (simple) - Forest	X	X	X
SE04 West coast spruce forest	Sweden	Terrestrial (simple) - Forest	X	X	X

Table 1b. List of the EnvEurope sites with involvment in EnvEurope campaigns (2011 and 2012) (continued).

Rational for parameters selection for the A5 campaign

Selection criteria
The parameters should be:
- Feasible by many/all partners
- Relevant for different ecosystems (same or similar indicator tested in different ecodomains)
- Related to long-term data sets and/or exemplary exercise (e.g. valuable as a common parameter to be collected in 2011-2012 also at EnvEurope – LTER sites where it has not been previously collected)
- Useful also to A3 elaboration purposes (e.g. collect a further data-set for that parameter during A5 2012 campaign)
- Suitable for up scaling, GMES (Remote sensing), visualisation (example available at UK Environmental Change Network – ECN see http://data.ecn.ac.uk/index.asp; http://data.ecn.ac.uk/indicators/composite.asp?graphtype=ENG)

Base for parameters/indicators selection
- Starting point: the basic parameter list included in the project proposal (table 2, page 7).
- The „frequency" table of what is currently measured/assessed at LTER site (analysis by A2, A3 and A5 (figure 1, page 7)
- Elaboration during EnvEurope: the A2 indicator/parameter matrix/table on which EnvEurope worked from the A5-A2-A3 meeting in Rome (June 2011) to the technical meetings in Bucharest (November 2011)
- Possibility to test or compare methods

Some important considerations:
- Emphasis is given to those indicators/parameters that are cross-domain
- Focus on those parameters for which trends can be derived using past data sets (long-term)
- Consistency and relationships: the assessed parameters/indicators should be linked or have mutual importance/reference (e.g. habitat structure and biomass)

PARAMETERS

Meteorology (Air temperature and humidity, precipitation, wind speed, irradiance, etc.)	*all ecosystem types*
Primary Productivity	
Plant vascular species	
Naturalness / Environmental quality	
Target species (birds, fish, etc.)	
Phenological cycle	
Forest structure and Leaf Area Index	*only terrestrial*
Fragmentation of natural areas	
Soil temperature and chemistry	
Tree condition	
Invertebrates in terrestrial ecosystems	
Atmospheric deposition (N,S etc)	
Pollutants (ozone)	
Detritus cycle (deadwood in forest ecosystems)	
Water column (temp, salinity, nutrients etc) in lakes	*only freshwater/marine*
Zoobenthos in lakes	
Sediments (texture, redox, nutrients etc) in freshwaters	
Water column (temp, salinity, nutrients etc) in freshwater/marine ecosystems	
Detritus cycle (sediments) in freshwater/marine ecosystems	
Phytoplankton dynamics in freshwater/marine ecosystems	
Bacterioplankton dynamics in freshwaters	
Macrophytobenthos in freshwater/marine ecosystems	
Microphytobenthos in marine ecosystems	
Zooplankton dynamics in freshwater/marine ecosystems	
Zoobenthos in freshwater/marine ecosystems	
Necton community in freshwater/marine ecosystems	
TOT. 26	

Table 2. The parameters table included in the project's text annexed to the Grant Agreement

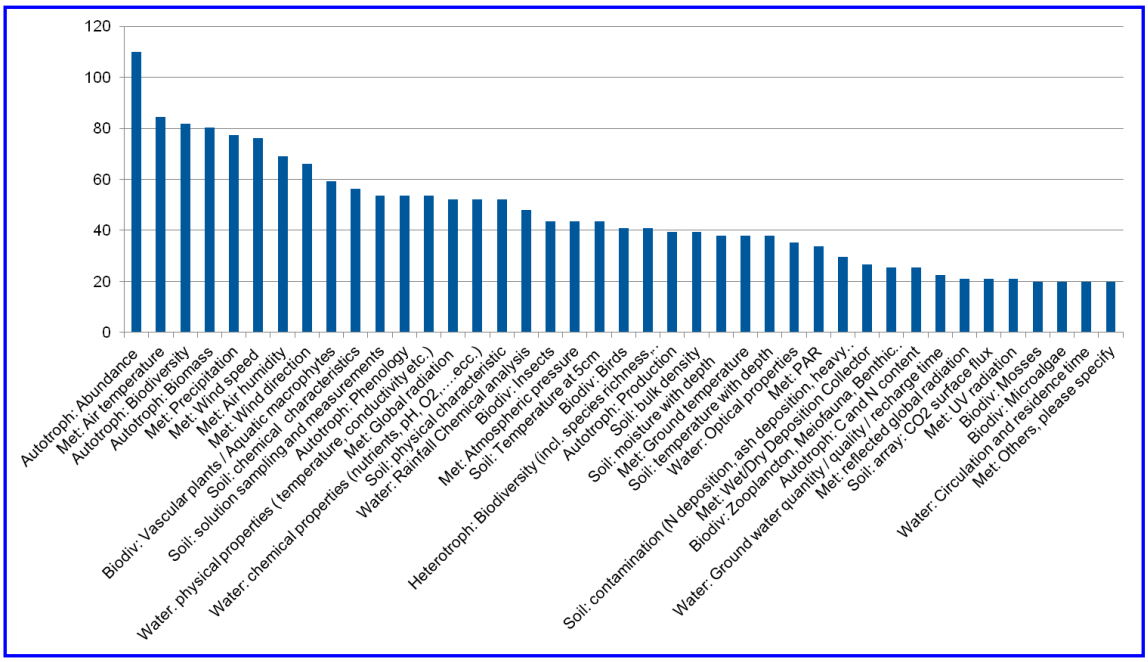

Figure 1. Frequency of parameters assessed at EnvEurope – LTER sites (source: questionnaire proposed by Action 2)

Field activity performed in 2011

The effective implementation of the experimental phase in 2012 will build on the existing network of sites and on the measurements and approaches already applied since medium to long-term periods. In this respect, several ABs of EnvEurope have performed A5-related activities in 2011.

Among the activities, we mention (list not exclusive):

- Meetings among site responsibles
- Meetings to organise A5 activities for the future
- Data and parameters collection at sites (mostly under direct ABs' coordination) to maintain long-term series, to perform measurements starting from the original parameter table (table 2) and to prepare for the 2012 campaign
- Time devoted to organise External Assistance (EA) with non-EnvEurope partners and report contracts signed with expected expenditure amount.

The sites that performed field activity in 2011 are reported in table 1a and 1b (column 5). Some of these activities have been presented at the Bucharest meeting (November 2011) by a number of EnvEurope ABs. Presentation with all details are available at http://www.enveurope.eu/docs/meetings/plenary-meeting-bucharest-14-18-november-2011/copy2_of_a2-technical-meeting-16-november. A table with parameters assessed at the different sites is reported at the end of the paragraph (table 3a and 3b).

The ABs that presented in Bucharest are the following: IEB-HAS, Hungary; UniDeb, Hungary; CFS, Italy; CNR, Italy (IBAF and ISMAR); IETU, Poland. Briefly, the presentations dealt with:

IEB-HAS, Hungary:

The activity was related to the Kiskun site and included acquiring a data set on long-term data and modelling on atmospheric deposition at the site.

Within 2011, the assessment of Aboveground Net Primary Productivity was continued with harvest at the time of maximum aboveground biomass of 32-35 grassland quadrants of 0.5x0.5 m with survey of species list and visual abundances (relevé), measurement of Leaf-area index and aboveground biomass by species and Field remote sensing by CROPSCAN

UniDeb, Hungary:

Activity was related to contacts with external assistance partners and measurements at the Síkfőkút forest Site with the aim of maintaining long-term data series, providing basic research facilities for specialized projects, teaching field measurement methods and implementing long-term projects such as the DIRT ILTER project on litter inputs, the Multisite experiments within AlterNet and the Hungarian Forest and Climate project. Several biotic and abiotic parameters were collected, including campaigns on functional variables (e.g. gas exchange).

CFS, Italy:

CFS coordinates the activities of most of the Italian Forest Sites in EnvEurope where the ICP-Forest protocol has been applied within 2011. Furthermore, CFS has the coordination of the external assistance contracts for two additional terrestrial sites (High Elevation Apennines. IT_01 and Coastal Dunes. IT_20). Within 2011, 4 specific meetings for planning and organizing External

Assistance have been organised, including collection of data and metadata for EnvEurope Actions' needs.

CNR, Italy (IBAF and ISMAR):

In 2011, ISMAR organised a cruise in the Northern Adriatic Sea, one of the marine sites within EnvEurope. The main activities on board of the scientific vessel were the following: Hydrology (main oceanographic features); Biogeochemistry (nutrients, chlorophyll, organic matter); Planktonic and benthic populations; Geology (geomorphology, ROV; Hypespectral signatures. Activities involved also intercalibration exercises on parameters and maintenance of long-term measuring stations. Training was also one of the aim of the cruise and a number of places on the vessel were reserved for students (graduates and doctorates).

IBAF performed, in all the Italian forest sites included in EnvEurope, the sampling of foliage for nutrient analysis. This survey is organised every two years with common protocols at all ICP-Forest sites in Europe. The activity is related to the long-term data series on foliage nutrients that, for some sites, dates back to 1995.

IETU, Poland:

Activities were related to three sites under direct AB coordination (Brenna; Slowinski National Park and Tatrzanski National Park) and four sites managed by Warsaw University under external assistance. Activity at Brenna, Slowinski NP and Tatrzanski NP was related to maintain the long-term series on meteorology, atmospheric deposition, soil solution chemistry and vegetation diversity.

At the two lacustrine sites of Morskie Oko and Czarny Staw, Warsaw University measured basic abiotic variables (oxygenation, pH, temperature, conductivity) and biotic (phytoplankton and zooplankton biomass) parameters. At a third lacustrine site (Mikołajskie Lake), an investigation of macrophytobentos with comparison with data from the seventies was performed at 10 localities, together with measurement of basic environmental parameters (water temperature, concentration of dissolved oxygen, pH of water, conductivity, visibility of Secchi disk). At the Białowieska Primeval Forest, climate parameters, phenology of forest ground vegetation, level of ground water and spatial range over time of wild boar rooting were measured in plots already established in the sixties.

Other partners briefly summarised their activities as follow:

UFZ, Germany

Report on activities on 4 agricultural landscapes 4 km x 4 km. Data on vegetation and land-use, dating up to one century and more. Vegetation is surveyed on a three-year base, pollinator annually and birds every three years. Sites are connected to the TERENO initiative.

CSIC, Spain:

Monitoring took place at Donana, particularly for plant species, habitats and meteorological parameters.

ERCE, Poland:

Activities at three complex sites, monitoring of chemical, plankton and fish parameters. At a National Park also vegetation.

UBA, Austria:

1 ICP-IM catchment (forest), regular ICP-IM annual protocol; 2 ICP-Forest sites under EA, regular ICP Forest protocol for uneven years. These sites performed activities useful also for A3 projects. EA contracts will be signed early next year on specific content.

UniBuc, Romania:

Activities in one complex, aquatic and terrestrial, site, particularly on diversity and meteorological parameters.

ICAS, Romania:

Site in a mountain forest where plant species, meteorology, tree condition and deposition were measured according to ICP-Forest methodology.

SENCK, Germany:

One complex site, a river catchment (1000 km2), with 100 km2 core area. Hydrology, impact of flooding on vegetation, spiders, carabids. Four subcontractors with 4(5) sites performed regular monitoring.

IBER, Bulgaria:

Sampling will be performed mainly in 2012 on five sites (2 forests, 1 river, 1 coastal with marine, 1 complex – wetland).

LUA, Lithuania:

Two sites (one at Curonian national park). At one of the sites, activities in 2011 focused on plant species, foliage nutrients, meteorology, deposition.

Data reporting will be done during 2012, as the data should go through elaboration and validation. In all monitoring and research networks, this procedure is normally done during the first months of the year following that of sampling (e.g. beginning of 2012 for 2011 and of 2013 for data collected in 2012).

Data will be collected according to data and metadata formats elaborated within Action 1.

Site Name	Country	Parameters assessed in 2011
AU01 Zöbelboden	Austria	Plant species, tree condition, meteorology
AU02 BFW1	Austria	Plant species, tree condition, meteorology, deposition
AU03 BFW2	Austria	Plant species, tree condition, meteorology, deposition
02 Lake Paijanne	Finland	Water column, zoobenthos, phytoplankton
06 Rhein Main Observ	Germany	Hydrology, impact of flooding on vegetation, spiders, carabids
DE-01-LH-FB Friedeburg	Germany	Plant species
DE-01-LH-GH Greifenhagen	Germany	Plant species
DE-01-LH-SS Schafstädt	Germany	Plant species
DE-01-LH-WL Wanzleben	Germany	Plant species
03 Kiskun	Hungary	Plant species, biomass
04 Sikfökút	Hungary	Plant species, meteorology, tree parameters
08 Southern Alpine Lakes	Italy	Water column, phytoplankton
11 North Adriatic Sea	Italy	Sampling cruise on scientific vessel (water column, buoys, Planktonic and benthic populations)
IT02 Forests of Alps	Italy	Plant species, foliage nutrients, meteorology, deposition
IT03 Forests of Apennines	Italy	Plant species, foliage nutrients, meteorology, deposition
IT04 Mediterranean Forests	Italy	Plant species, foliage nutrients, meteorology, deposition
IT05 Lowland forests	Italy	Plant species, foliage nutrients, meteorology, deposition
LT-01 Aukstaitija	Lithuania	Plant species, foliage nutrients, meteorology, deposition

Table 3a. Parameters collected in 2011 at sites that performed activities within EnvEurope

Site Name	Country	Parameters assessed in 2011
LT-03 Zemaitija	Lithuania	Plant species, foliage nutrients, meteorology, deposition
01 The Sulejowski Reservoir	Poland	Water column, phytoplankton
20 Lake Mikołajskie	Poland	Water column, phytoplankton
27 West Polesie BR	Poland	Water column, phytoplankton
15 Brenna	Poland	Meteorology, plant species, deposition
PL05 Tatrzański NP	Poland	Plant species, tree condition, meteorology
PL17 Kampinoski NP	Poland	Plant species, tree condition, meteorology
PL18 Primaeval Bialowieza Forest	Poland	Meteorology, phenology of ground vegetation, water table
01 Braila Islands	Romania	Water column, diversity
01 Braila Islands	Romania	Plant species, diversity, meteorology
RO01 Bucegi P. Craiului NP	Romania	Plant species
RO01 Bucegi P. Craiului NP	Romania	Plant species, tree condition, meteorology, deposition
01 Donana	Spain	Water column, phytoplankton
01 Donana	Spain	Plant species, meteorology, habitat
SP01 Donana	Spain	Plant species, meteorology, habitat
SE01 Northern coniferous forest	Sweden	Plant species, tree condition, meteorology, deposition
SE02 Central Swedish uplands spruce forest	Sweden	Plant species, tree condition, meteorology, deposition
SE03 South Swedish uplands spruce forest	Sweden	Plant species, tree condition, meteorology, deposition
SE04 West coast spruce forest	Sweden	Plant species, tree condition, meteorology, deposition

Table 3b. Parameters collected in 2011 at sites that performed activities within EnvEurope (continued)

The parameter set for 2012 "testing in the field" campaign

The parameters/indicators set for the 2012 field campaign is reported with all details and comments in four different documents (annex 1 to 4), one for each ecodomain (terrestrial, marine, freshwater – rivers and lakes), which represent the guidelines of what will be assessed during the campaign

The set contains both parameters and important accompanying ancillary/supporting variables relevant to assess the general status of the site (and comparison with other years).

Example:
- biodiversity assessment (list of species – flora, fauna) + meteorological/substrate basic parameters.
The scope is to test the network both for parameters that need a specific sampling campaign at sites and, at the same time, to characterise the "testing in the field" year for possible anomalies (and climate is the main candidate).

The set has two levels of detail:
Level 1 (all sites):
At least one parameter/indicator for each of the ecological integrity element (see table/matrix A2)

Ecosystem structure and processes
Biotic; abiotic; energy, matter and water budgets

This level will be the minimum common base for the campaign, with relevant cross-domain features and connections.

Examples: Species diversity/assemblage, main abiotic parameters (meteorology, chemistry), Leaf Area Index, grass coverage/biomass, chlorophyll in water

Level 2
Where possible and feasible, the analysis will be deepened.
This will be possible at a sub-set of sites, for example those under the coordination of EnvEurope ABs or those participating to other network where parameters are collected according to manuals and protocols with specific frequency.
The aim is to assess a parameter for as many as possible of the different ecological integrity indicators (different rows of the table/matrix develop within A2)

Ecosystem structure:
- flora and fauna diversity, habitat structure,
- soil, water, air, habitat heterogeneity

Ecosystem processes:
- input, storage, output, efficiency measures

For complex, large sites where different ecodomains are present and for Long Term Socio-Ecological Research sites (LTSER), an assessment of landscape scale basic indicators will be accompanied with measurements for at least one of the habitats included in the site.

The list of parameters is reported below:

TERRESTRIAL SITES

LEVEL 1 – ALL SITES

1. Ecosystem structure – Biotic Diversity

1.1 MAIN INDICATOR: flora diversity

Vascular plant species list, including abundance and coverage

1.2 MAIN INDICATOR: within habitat structure

Habitat diversity including, where possible and feasible, deadwood.

Vertical and horizontal structures of habitat within the site; number, type and coverage of layers.

2. Ecosystem structure – Abiotic heterogeneity

2.1 MAIN INDICATOR: soil

Soil type (FAO, WRB 2006), main soil characteristics, Soil C/N ratio

2.2 MAIN INDICATOR: air

Main meteorological variables. Annual mean temperature and precipitation as a minimum.

2.3 MAIN INDICATOR: habitat diversity

Cover of Corine/EUNIS land uses and habitats

2.4 MAIN INDICATOR: additional

Management, Presence of natural disturbances (and types)

3. Ecosystem processes – Energy budget

3.1 MAIN INDICATOR: energy input

Global radiation reaching the site

3.2 MAIN INDICATOR: energy storage (relevant also for matter storage)

Aboveground biomass by indirect methods. Direct sampling/measurements where feasible

LEVEL 2 – SELECTED SITES (WHERE POSSIBLE)

A. Ecosystem structure – Biotic Diversity

A.1 MAIN INDICATOR: fauna diversity

Species list, particularly for animals under Habitat/Birds directive

A.2 MAIN INDICATOR: within habitat structure

Leaf Area Index

A.3 MAIN INDICATOR: additional variable

Phenology of dominant cover at the site. Main phenological phases for dominant cover.

A.4 MAIN INDICATOR: additional variable

Health status of ecosystem

B. Ecosystem structure – Abiotic heterogeneity

B.1 MAIN INDICATOR: water

Soil water content – Presence/absence (depth) of water table. Susceptibility to drought

C. Ecosystem processes – Energy budget

C.1 MAIN INDICATOR: energy input

Net radiation, absorbed radiation

C.2 MAIN INDICATOR: energy efficiency measures

Aboveground net primary production (ANPP), Net Primary Productivity (NPP) (where possible), History of tree growth by tree ring widths

D. Ecosystem processes – Matter budget

D.1 MAIN INDICATOR: matter input

Aboveground Litterfall

D.2 MAIN INDICATOR: matter input

Atmospheric deposition of main nutrients. Chemistry of precipitation and snow

FRESHWATER SITES: RIVERS

LEVEL 1 – ALL SITES

1. Ecosystem structure – Biotic Diversity

1.1 MAIN INDICATOR: flora diversity

Macrophytes, phytobentos diversity, at a detail to be representative for the site/plot for 2012.

2. Ecosystem structure – Abiotic heterogeneity

2.1 MAIN INDICATOR: water

Main hydrological, hydrodynamic parameters

2.2 MAIN INDICATOR: habitat diversity

Microhabitat diversity

2.3 MAIN INDICATOR: habitat diversity

Cover of Corine/EUNIS land uses and habitats

2.4 MAIN INDICATOR: additional

Management (e.g. fishing), Presence of natural disturbances (and types)

3. Ecosystem processes – Energy budget

3.1 MAIN INDICATOR: energy input

Radiation (chlorophyll), temperature

LEVEL 2 - SELECTED SITES (WHERE POSSIBLE)

A. Ecosystem structure – Biotic Diversity

A.1 MAIN INDICATOR: fauna diversity

Macroinvertebrate, Fish at a detail to be representative for the site/plot for 2012.

A.2 MAIN INDICATOR: additional variable

Phenology. Main (simple) phenological phases assessed for macrophytes, phytobenthos)

B. Ecosystem processes – energy budget

B.1 MAIN INDICATOR: other state variables

Meteorology at the site

C. Ecosystem processes – Matter budget

C.1 MAIN INDICATOR: matter input, matter storage

Nutrients (nitrogen, phosphorous)

FRESHWATER SITES: LAKES

LEVEL 1 – ALL SITES

1. Ecosystem structure – Biotic Diversity

1.1 MAIN INDICATOR: flora diversity

Phytoplancton (primary producers) diversity

2. Ecosystem structure – Abiotic heterogeneity

2.1 MAIN INDICATOR: water

Physical/chemical characteristics

2.2 MAIN INDICATOR: air

Basic climate at the site. Annual mean temperature and precipitation as a minimum. Monthly temperature (mean, min and max) and precipitation desirable.

2.3 MAIN INDICATOR: habitat (diversity)

Transparency (Secchi disk)

2.4 MAIN INDICATOR: habitat diversity

Cover of Corine/EUNIS land uses and habitats

2.5 MAIN INDICATOR: additional

Management (e.g. fishing), Presence of natural disturbances (and types)

3. Ecosystem processes – Energy budget

3.1 MAIN INDICATOR: energy input

Radiation, temperature

3.2 MAIN INDICATOR: energy storage

Chlorophyll a (connected to biomass in lakes)

LEVEL 2 - SELECTED SITES (WHERE POSSIBLE)

A. Ecosystem structure – Biotic Diversity

A.1 MAIN INDICATOR: fauna diversity

Zooplankton, Fish

A.2 MAIN INDICATOR: within habitat structure

Macrophytes

B. Ecosystem structure – abiotic heterogeneity

B.1 MAIN INDICATOR: soil

Sediment characterisation

C. Ecosystem processes – energy budget

C.1 MAIN INDICATOR: energy efficiency measures

Primary production, biomass

MARINE SITES

LEVEL 1 – ALL SITES

1. Ecosystem structure – Biotic Diversity

1.1 MAIN INDICATOR: flora diversity

Primary producers (phytoplankton, macrophytes, microphytobenthos) diversity

2. Ecosystem structure – Abiotic heterogeneity

2.1 MAIN INDICATOR: water

Physical/chemical characteristics: Temperature, salinity, transparency Oxygen, pH

2.2 MAIN INDICATOR: water

Physical/chemical characteristics: light quantity and quality (Transparency, Secchi disk)

2.3 MAIN INDICATOR: habitat diversity

Cover of Corine/EUNIS land uses and habitats

2.5 MAIN INDICATOR: additional

Management (e.g. fishing). Presence of natural disturbances (and types)

3. Ecosystem processes – Energy budget

3.1 MAIN INDICATOR: energy input

Total irradiance

3.2 MAIN INDICATOR: energy storage

Chlorophyll a (connected to biomass of phytoplankton)

LEVEL 2 - SELECTED SITES (WHERE POSSIBLE)

A. Ecosystem structure – Biotic Diversity

A.1 MAIN INDICATOR: fauna diversity

Secondary producers (Zooplankton, Fish, zoobenthos)

A.2 MAIN INDICATOR: within habitat structure

Macrophytes – seagrasses

B. Ecosystem structure – abiotic heterogeneity

B.1MAIN INDICATOR: sediment (soil)

Sediment characterisation

B.2 MAIN INDICATOR: air

Basic climate at the site. Annual mean temperature as a minimum.

C. Ecosystem processes – energy budget

C.1 MAIN INDICATOR: energy input, energy efficiency measures

Primary production, biomass

D. Ecosystem processes – matter budget

D.1 MAIN INDICATOR: matter input

Nutrients input fluxes

D.2 MAIN INDICATOR: matter output, matter efficiency measures

Accumulation rates in sediment; carbon flux to sediments

Protocols, methods, expertise

Methods and data quality features (frequency of measurements, etc.) are listed in the A2 table/matrix. An additional table will be provided by Action 5 by end of January 2012 including the indicator/parameter methods and time resolution. The table can be used, together with other material, as a reference “field tool” during the 2012 campaign.

It is desirable that methods are shared among sites as the field campaign will represent a test of methods within the network.

In all cases, documented methods shall be used and reported.

The description of protocols and the proper reference to manuals or to published works have to be provided at the starting of the campaign, they will be archived and used in data analysis.

A5 coordination will ensure that expertise will be shared within the network, among Associated Beneficiaries and external partners.

Data delivery issues

November 2012 is the final date set by Action 1 for data submission to the database. This will allow data validation and elaboration in the first months of 2013. In some specific and limited cases, it will be possible to submit and report data collected in December 2012 (e.g. monthly temperature and precipitation).

The issue of data validation is crucial. As an example, in some monitoring networks (e.g. ICP-Forest, ICP integrated Monitoring) data of a certain year are checked and validated within the first months and submitted by April of the following year. In this respect, EnvEurope will request an effort to participating sites to submit data as early as possible and, for those surveys that can be closed within summer (e.g. biodiversity assessment, habitat structure, maps, biomass, etc.), to submit data by November 2012. For certain surveys, generally of A5 level 2, a submission date will be agreed together with Action 1 and 3, so that data can be used for elaborations and analysis by EnvEurope during 2013. Nevertheless, it is advisable that data for those parameters/indicators finalised before November 2012 are submitted before November 2012.

Sampling or survey campaigns for the different parameters/indicators will start when meaningful for their assessment (e.g. spring for vegetation biodiversity, season's peak for Leaf Area Index). In this respect, participating sites responsibles will provide, under the coordination of A5 regular updates on started and performed activities. A dynamic map showing what is happening will be implemented on the web site.