BiodivERsA 2011-2012 call for proposals

Biodiversity dynamics: Developing scenarios, identifying tipping points and improving resilience

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The ERA-NET promoting European research on biodiversity

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Natural Environment Research Council, UNITED KINGDOM

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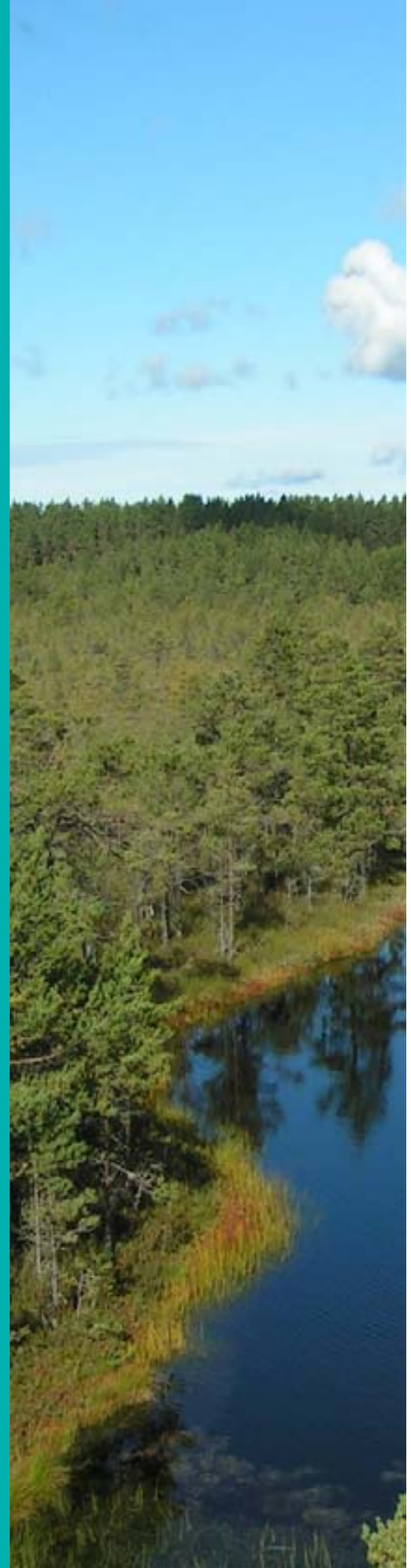

From the Coordinator:

Xavier Le Roux, Coordinator of BiodivERsA

Once upon a time… Atlantic cod was a very common food for Northern Europe and the islands of the North Atlantic. Cod was easy to catch, stocks being abundant, and cod sizes could easily reach 1-1.5 m in length. However, in the middle of the 20th Century, the fishing industry switched from mainly coastal fishing using small vessels to industrial bottom fishing using trawl nets that can explore deeper waters. Catches increased considerably, but this rapidly lead to a decrease in cod abundance and size. After complete collapse of cod stocks in the late 80s, the commercial cod fishery had to be closed in the early 90s, artisanal fishery in Newfoundland even reaching an end at the beginning of the 21st Century, with severe social and economic consequences. How could this have happened? Well, this is what is called a tipping point: due to the massive disruption of this environment, including major shifts in cod population size, cod populations and more generally the marine ecosystem they were part of passed a threshold beyond which cod stocks could hardly recover even with a complete ban on fishing. In other words, these marine systems lost their resilience capacity - defined as their ability to recover their previous status.

The collapse of cod stocks, a typical tipping point story

What does this - unfortunately true - story tells us ?
Firstly, that biodiversity is often very important for human activities and well-being, but that non-sustainable human activities including overexploitation are putting nature and biological resources at risk. Secondly, that there exist threshold values of disturbances and degradation levels beyond which biodiversity and ecosystems at a given place switch from one status to another. The problem is that the new status is hardly predictable and can be far less favourable for human activities and well-being.

Thirdly, that we urgently need to improve our capacity to develop projections of the possible fate of biodiversity and socio-ecosystems in the future, through the development of scenarios with a temporal horizon consistent with global change challenges, i.e. over the next few decades.

The increasing need to reinforce the ability of research to develop biodiversity scenarios, understand and anticipate possible tipping points, and ultimately enhance the resilience capacity of biodiversity and socio-ecosystems, have been early recognised by partners of the ERA net BiodivERsA, who decided in June 2011 to launch a call for proposals aiming at reinforcing research on these themes. This brochure presents an overview of the BiodivERsA 2011-2012 joint call, including its development, the profile of submitted proposals, and the results of the proposals' evaluation procedure. Each funded project is also briefly presented.

BiodivERsA funds biodiversity research addressing the most pressing issues, both in terms of cutting edge science and policy relevance.

BiodivERsA is the network of national research funding organisations from European countries that fund biodiversity research addressing the most pressing issues, both in terms of cutting edge science and policy relevance. Because the issue of biodiversity loss and ecosystem service degradation has to be tackled not only at the local but also regional and global scales, we clearly need to better integrate biodiversity research across borders, in particular in Europe. The recent implementation of IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) shows the need for increased dialogue between the biodiversity research community, decision makers and other stakeholders to provide appropriate solutions for strengthening the conservation and sustainable management and use of biodiversity. Moreover, it calls for building coordinated strategies and programs of research at the international level. BiodivERsA's mission is very consistent with this vision as it supports coordinated pan-European research into the conservation and sustainable management of biodiversity, with the ultimate aim to provide policy makers and other stakeholders with adequate knowledge, at the European and international levels.

Compared to other fields, biodiversity research is still relatively fragmented and funding opportunities for European biodiversity research are likely to be scarce. Nevertheless, there still is a large and active research community focusing on biodiversity issues in an international context, which is demonstrated by the large interest in BiodivERsA calls. Benefiting from its network of 21 funding organisations from 15 European countries, BiodivERsA is positioned among major actors in the European biodiversity research landscape. With the launch of its third call in four years, the network has continued to prove its ability to work as a powerful financial lever with a budget of approximately €8-10M per call, representing around 17 times the EC's original investment.

BiodivERsA approach is increasingly strategic, relying on more solid rationales and mapping activities : analysis of national and European strategies, of current status of stakeholder engagements in biodiversity research projects, of funding profile for biodiversity research and type of funded research. In this regard, the BiodivERsA database

With the launch of its third call in four years, the network works as a powerful financial lever with a budget of approximately €8-10M per call, representing 17 times the EC's original investment.

The 2011–2012 call allowed the funding of nine projects for a total amount of €8.8M across 8 countries.

BiodivERsA is now launching annual calls for proposals on prioritised topics, supporting pan-European biodiversity research with a total budget of €34M.

is one of the key products developed by our network. It has been launched in May 2013 and is accessible via the BiodivERsA website (http://data.biodiversa.org) . This database compiles information about past and current funding programs on biodiversity in Europe (thematic and open calls and grants), funded projects, research organisations and researchers leading the funded projects. Including more than 6500 projects funded competitively at the national or European level, the BiodivERsA database is a major tool for mapping exercises. The database will also help scientists in the EU to identify potential resources and network opportunities to further develop their research, research managers to better profile biodiversity research in Europe, and stakeholders to search scientific expertise to specific biodiversity issues.

BiodivERsA currently organises joint activities founded on a common strategic approach. In particular our network launches annual calls to promote and support pan-European research projects on key biodiversity issues. In 2010, BiodivERsA launched a call (its second one) on "Biodiversity and ecosystem services, and their valuation" for a total funding amont of €9.5M. In 2011, the network launched a call on "Biodiversity dynamics: developing scenarios, identifying tipping points, and improving resilience" for a total funding amount of €8.8M, which is presented hereafter. BiodivERsA has pursued its goal by launching a fourth call in 2012 on "Invasive species and biological invasions".

Together with strategic joint activities, the number and quality of projects funded by BiodivERsA demonstrate that our network plays an increasingly significant role for biodiversity research integration at the European level, spurring the generation of new knowledge to better inform policy makers and stakeholders in face of pressing and renewed societal issues.

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Lyon, France 15 May 2013

BiodivERsA's consortium, May 2012 in Stockholm

Development of the call text

Each BiodivERsA joint call is designed so as to respond to pressing issues related to conservation and sustainable management and use of biodiversity and associated ecosystem services; would it be on a scientific, political or societal level. This involves a special effort to consider both national and international strategies with respect to partner agencies' priorities, in order to ensure the continued relevance of BiodivERsA calls at the European level. To satisfy these standards, BiodivERsA partners have developed an innovative scheme for identifying research priorities of shared interest, resulting in a common rolling agenda that is updated each year.

This mechanism was originally conceived in early 2011 and has already proven its efficiency with the definition of the BiodivERsA agendas 2011-2012 and 2012-2013, from which the 2011-2012 and 2012-2013 call topics were extracted. In summary, the process involves topic proposals suggested by partners, and subsequent analysis by a range of experts in light of national and international strategies as well as possible gaps in the scientific knowledge and European added-value. In pursuing its objective of mapping the state of biodiversity research in Europe, through the completion of its database and the analysis of national and international strategies, BiodivERsA expects to improve and broaden this mechanism year after year.

In June 2011, during the General Assembly of the ERA-net, BiodivERsA partners agreed to develop a topic focused on biodiversity scenarios, tipping points and resilience as the subject of the 2011-2012 joint call. On this basis, the topic has benefited from the inputs of independent experts to build and support key strategic axes in terms of scientific, political or societal consistency. Finally, the text of the call was adopted by the Call Steering Committee in September 2011.

BiodivERsA's partners have designed a mechanism to define a common rolling agenda from which call topics are extracted.

BiodivERsA's common agenda is built upon existing research strategies, and priorities set by the partner agencies at national and international levels.

11 BiodivERsA partners representing 10 countries decided to participate in the call: **FWF (Austria), BelSPO (Belgium), BNSF (Bulgaria), ANR and MEDDE (France), PT-DLR (Germany), RCL (Lithuania), RCN (Norway), FCT (Portugal), Formas (Sweden), and MFAL (Turkey).** Representatives of these 11 funding agencies set up the Call Steering Committee (CSC).

The Estonian BiodivERsA partner, ETAG, has provided the Secretariat of the Call with great skill and personal involvement. The call was published on the 1st of November 2011; a pre-announcement of the call was sent out during the Summer 2011. The deadline for submitting proposals was in mid-February 2012, and funding decision was published in June 2012. The earliest possible starting date of funded project was in Fall 2012.

Summary of the 2011–2012 BiodivERsA call

The call has been designed around the major challenge of "developing scenarios, identifying tipping points and improving resilience". The three main scientific themes of this call are detailed below:

1) Developing biodiversity scenarios

The development of qualitative and quantitative biodiversity scenarios that are of much utility for decision making requires new approaches and greater collaboration between the social and natural sciences. Particular emphasis is placed on research that explores the dynamics of complex social-ecological systems, in particular over spatial scales ranging from sub-global (e.g. Europe) to local. Development of scenarios should include sensitivity analysis of results and should consider different decision process options.

2) Understanding and predicting biodiversity resilience and tipping points

This includes research on the processes that mediate biodiversity resilience and tipping points and the capacity of social-ecological systems to adapt to rapid global changes. It also encourages the development of models that can be used to assess resilience and tipping points in social-ecological systems and quantitative methods for detecting early warning signs of tipping points.

3) Decision support for biodiversity policy and management

Policy makers and resource managers are not familiar with the use of biodiversity scenarios and have often too little knowledge on biodiversity resilience capacity and tipping points mechanisms. Therefore, research priority should be given to studying management options and policies that enhance the resilience of biodiversity and socio-ecosystems as well as avoid tipping points.

Evaluation process

The Call Steering Committee (CSC) was responsible for implementing the call and for appointing the Evaluation Committee (EC) members amongst experts from natural and social scientific fields together with professionals from the field of biodiversity. These experts were divided between two sub-committees: A scientific sub-committee led by Jari Niemelä (chair of the EC) and a policy sub-committee led by Simon Gardner (vice-chair of the EC).

The evaluation of the 41 project proposals took place between February and May 2012. Each proposal was first evaluated by external reviewers through March-April. The evaluation guidelines provided specific assessment criteria. The EC met on May 22 and 23 to discuss about the proposals and produce the final ranking to be transferred to the CSC. Each sub-committee met first separately and then the whole EC met in plenary for the final ranking. The BiodivERsA guidelines allow the assignment of two marks per proposal (one for scientific excellence and one for policy relevance) on a scale from 1 to 5. On this basis, the proposals were ranked, with a predefined emphasis on scientific excellence over policy relevance.

From the Evaluation Committee chairs

The BiodivERsA 2011-2012 call had a timely and important theme 'Biodiversity dynamics: developing scenarios, identifying tipping points and improving resilience.' This theme responds to the increasing need from society for predictions on how biodiversity will change in the face of the ever increasing human impact on nature. Research so far has shown that ecological systems rarely respond to disturbances and stresses in a linear and predictable way. Thus, research on thresholds and tipping points is of vital importance. The ultimate aim is to strive towards socio-ecological resilience, a goal that requires innovative and multidisciplinary research.

The call attracted 41 applications from a wide range of specific topics. The requested research funding was almost €33M, more than 5 times greater than was available. The BiodivERsA countries were well represented in the projects with only two of the participating countries failing to host any coordinators. France was the most active country with about one third of the projects being coordinated by a French institution. It was interesting to note that this research is still very male-dominated with women only making up a quarter of the total coordinators.

Although the proposal topics were very varied, they corresponded well to the requirements of the call. Projects dealt with issues as diverse as developing integrated biodiversity scenarios, understanding and predicting biodiversity resilience and tipping points, and providing decision support for biodiversity policy and management, for a range of environments.

As in the previous year, the evaluation committee worked in two parallel sub-committees. One of these assessing scientific merits, and the other evaluating the policy relevance of the proposals. After separate meetings, the two panels met in plenary to identify the most highly rated projects for funding. The selection of the top projects was not easy and, despite the 20% success rate, many high-quality consortia remained unfunded.

Overall, the scientific quality of the projects submitted was high, but many were weaker as regards policy relevance, stakeholder engagement and knowledge exchange. Integrating natural sciences and social sciences into a scientifically credible and societally relevant proposal is not easy, but the environmental challenges that we face call for such an approach. Year after year, BiodivERsA thus promotes pluri-disciplinarity and stakeholder engagement in research projects.

We would like to congratulate the successful projects that received funding and wish them good luck in their important research. We would also like to thank members of the Evaluation Committee for their hard and dedicated work, staff of the Estonian Research Council and BiodivERsA secretariat, and the national funding agencies for making this significant research possible.

Prof. Jari Niemelä Dr. Simon Gardner

Scientific evaluation sub-committee

ARBACIAUSKAS Kestutis – LITHUANIA
AZQUETA Diego – SPAIN
BIGGS Reinette – SWEDEN
BOLGER Thomas – IRELAND
CELLAROVA Eva – SLOVAKIA
COUSINS Sara – SWEDEN
DUCHOVSKIS Pavelas – LITHUANIA
GEORGIEV Boyko – BULGARIA
JESCHKE Jonathan – GERMANY
KALTENBORN Bjørn – NORWAY
MAGGS Christine A. – UNITED KINGDOM
MARSDEN Stuart J. - UNITED KINGDOM
MOILANEN Atte Jaakko – FINLAND
NIEMELA Jari – FINLAND (chair)
PLIURA Alfas – LITHUANIA
RENOU-WILSON Florence – IRELAND
ROELOFS Jan – THE NETHERLANDS
TAN Ayfer - TURKEY
WHITTINGHAM Mark – UNITED KINGDOM

Policy relevance evaluation sub-committee

BERGMAN Peter – SWEDEN
DENDONCKER Nicolas – BELGIUM
GARDNER Simon – UNITED KINGDOM (vice chair)
HUESCO Katia – SPAIN
JOUVE Marcel - FRANCE
LøBERSLI Else – NORWAY
MANUSADZIANAS Levonas – LITHUANIA
MIRAN Bülent – TURKEY
PLESNIK Jan – CZECH REPUBLIC
VOINOV Alexey – THE NETHERLANDS
VON TEUFFEL Konstantin – GERMANY
WALLS Mari – FINLAND

Jari Niemela

Simon Gardner

Analysis of the submitted research projects

Overall figures of the call

	No. of proposals (No. of eligible teams)
Submitted proposals	41 (216)
Selected proposals	9 (41)

Success rate of submitted proposals is 22% for a total funding of €8.8M

The 2011-2012 BiodivERsA call has attracted some 800 individual participants from 216 teams, who have joined together to form 41 consortia built around pan-European research project proposals. The participation was slightly lower than for the previous call, mainly due to the fact that the scientific topic was more focused. The success rate finally reached 22%. Indeed, the high quality of the proposals and the flexibility of several funding agencies allowed the funding of nine excellent pan-European projects for a total of €8.8M.

Nationality of the applicants

BiodivERsA joint calls promote pan-European research projects although self-financed partners from other countries are allowed to take part in the consortia. 88% of the 278 teams who submitted proposals came from the ten countries participating in the funding of the call, of which seven are part of EU-15 countries. Close to 92% of the teams came from EU-27 countries. In addition, a few applicants (self-financed) were from other geographical areas (5,4%).

The geographical origin of participating teams in the BiodivERsA 2011-2012 call was as follows:

Participating countries: Austria, Belgium, Bulgaria, France, Germany, Lithuania, Norway, Portugal, Sweden, Turkey;

Other European countries: Hungary, Italy, The Netherlands, Poland, Romania, Spain, UK

Europe – other: Switzerland

Others: Cameroun, Central Africa, Gabon, Guinea Equatorial, Madagascar, Republic of the Congo, South Africa, Tunisia, USA

Reserved and requested budgets, and funding model

Reserved budget per country was published during the announcement of the call, which has influenced some of the budget requests made by applicants. Indeed, the highest values of both reserved and requested budgets were observed for France, Germany, and Sweden, and to a lesser extent for Austria, Belgium, and Norway (Figs. 1 and 2).
When the reserved budget proved insufficient as for example with German and Swedish partners, this did not cause any issue during the funding process thanks to the flexibility of the partners. The weighting of budget requested, combined with agencies flexibility led to the funding of the nine top-ranked projects, in accordance with the ranking established by the evaluation committee.

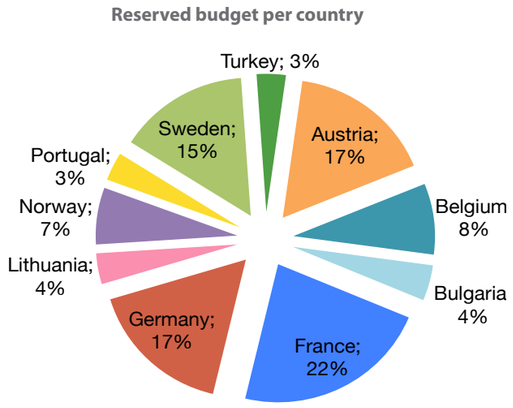
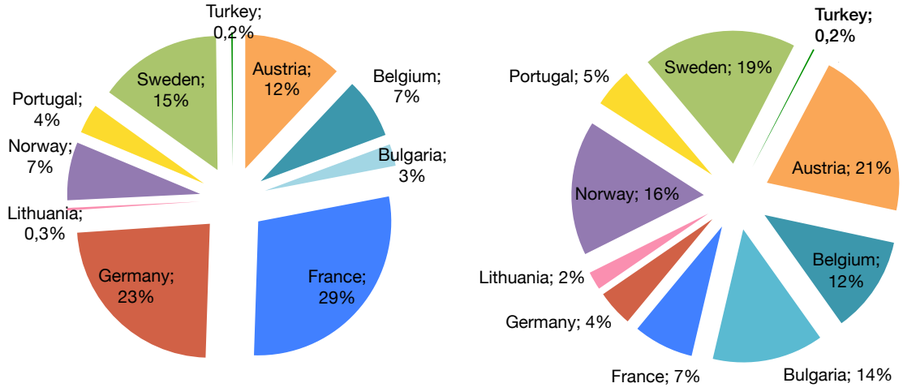
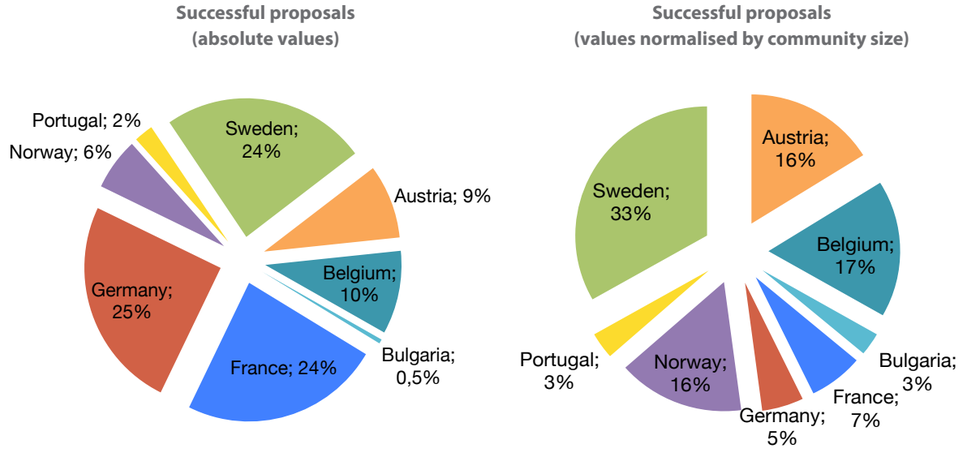


Fig. 1: Distribution of the reserved budget from each country



Despite a relatively low participation in terms of reserved budget (Fig 1), the biodiversity scientific communities from Bulgaria, Norway and Austria, actually responded well to this call once the budget requests are normalised according to the estimated number of researchers from all scientific areas in each country. Unfortunately, there is no available data to know precisely the size of the specifically targeted biodiversity research community within the overall research community of each country (Fig. 2).

Fig. 2 : Budget requested by applicants among countries, in (left) absolute values, and (right) values normalised according to the size of the national scientific community (Full Time Equivalent unit; – source: Eurostat 2010)



Among the nine successful proposals, the 2011-2012 call funded teams from eight different countries (Fig.3). A large number of funded teams came from the participating countries with the most important amount of funding, namely Germany, Sweden and France. It should be noted that when considering the amounts normalised according to the estimated number of researchers in each country, other countries emerge as Austria, Norway and Belgium. Despite the participation of Lithuania and Turkey to the call, the nine funded projects did not involve research team from these countries.

Fig. 3: Distribution of awarded budgets to the successful applicants by country in (left) absolute values, and (right) values normalised according to the size of the national scientific community (Full Time Equivalent unit; – source: Eurostat 2010)

The Belgian, German and Swedish research teams applying to this call were particularly successful as demonstrated by their success rate, i.e. ratio of granted to requested funded amounts (Fig. 4). However, these figures should be viewed with caution given the low number of funded proposals for each country.

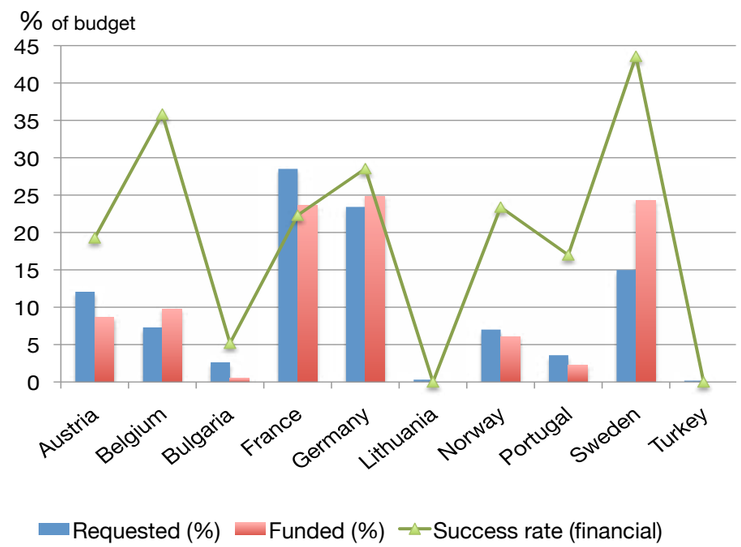


Fig. 4: Comparison between countries of (blue bars) the percentage in the proposals at the submission phase, i.e. for requested amounts (red bars) the percentage of budgets in the proposals after selection, i.e. for funded amounts, and (green triangle and line) the financial success rate

Number of proposals' coordination

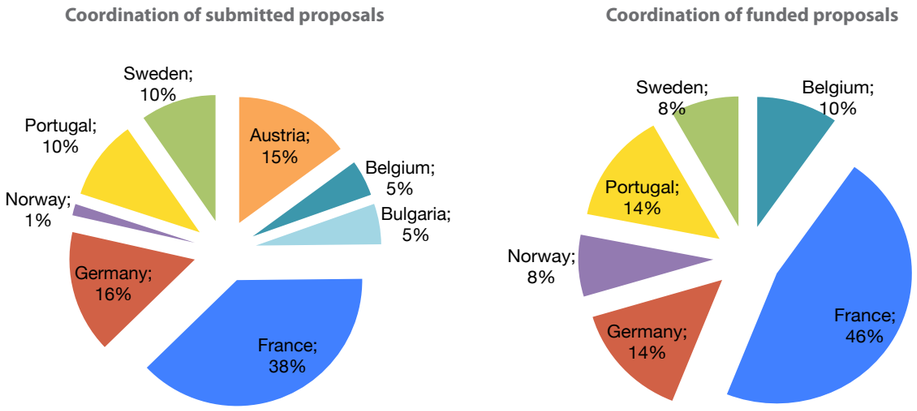
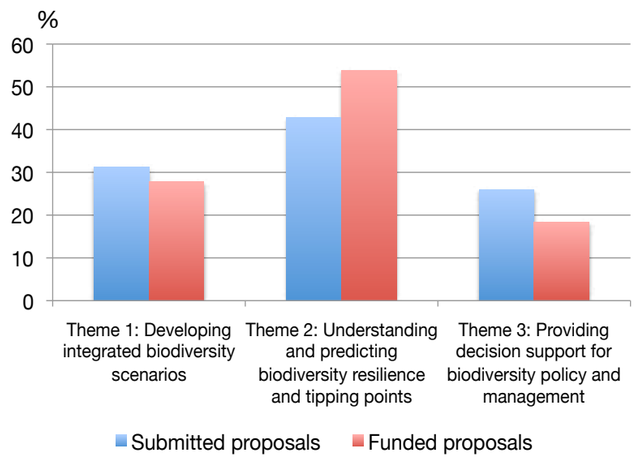


Fig. 5: Percentages of requested budget according to the country of the coordinators, for (left) submitted and (right) funded proposals

At the submission stage, 89% of the coordinators of proposals submitted were from Austria, France, Germany, Portugal and Sweden. At the end, the coordinators of funded proposals came from Belgium, France, Germany, Norway, Portugal and Sweden. Again, these figures should be viewed with caution given the very small number of coordination (respectively 41 and 9 for the submission and funding phases).

Call themes addressed by the proposals

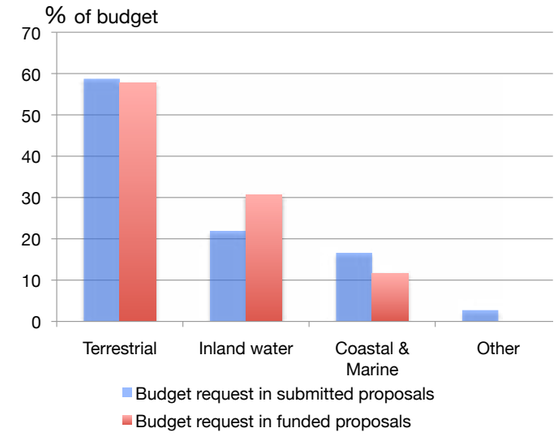
Fig. 6: Proportion of the proposed research topics themes between submitted and funded proposals. One proposal can address several themes.



During the submission phase, an indication of the relative importance of the theme(s) addressed by each proposal was given by the projects' leaders. This provided a clear view of the way each theme was considered (Fig. 6). Themes 1 and 2 were largely addressed while Theme 3 was less reflected in the proposals.

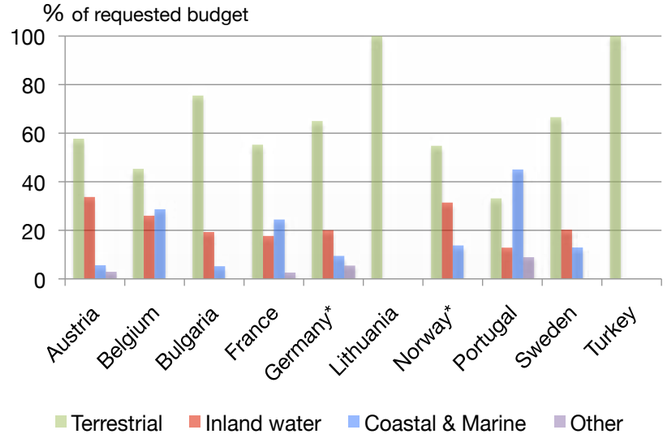
Types of studied environments

Fig. 7: Distribution of budget in submitted and funded proposals according to the studied environment. One proposal can study several environments.



Most of submitted and funded proposals focused on terrestrial ecosystems (Fig. 7), whereas those focusing on inland water and marine/coastal environments were fewer. Nevertheless, inland water environment is still reasonably well represented in the funded proposals. Again, we remind the reader that the figures for funded projects should be viewed with caution given the small number of projects (9). In addition, it should be noted that applicants were informed that German and Norwegian funding agencies would not fund studies in marine environments, which partly explains the few number of proposals including these environments.

Fig. 8: Percentage of requested budget in the submitted proposals by country according to the studied environment.



** Applicants were informed that German and Norwegian funding agencies would not fund studies focused on marine environments*

Terrestrial environment had the largest number of submitted proposals in each country except in Portugal where there were more proposals on marine ecosystems (Fig. 8). Portugal, Belgium and France were among the countries with the most proposals studying marine environments, while Austria, Norway and Belgium had the highest proportion of inland water-focused projects. Lithuania, Turkey and Bulgaria had the highest rates of submitted proposals on terrestrial environment but only few proposals were submitted from these countries.

Conclusion

This analysis provides much insight into the implementation and results of the BiodivERsA 2011-2012 call, which can be useful for future ones:

- Although the topic of this call is narrower than previous ones, BiodivERsA demonstrates its ability to mobilise several national agencies across Europe, with substantial funds involved. Also, it maintains a good participation of pan-European research consortia.
- The three themes of this call have been well addressed by the proposals, even if to a lesser extent for theme 3 on policy and management.
- As observed for previous calls, the funding amount reserved by a given country has some influence on the number of applicants for this country, which also differs according to the national scientific community size.
- Given the amounts of funding reserved by countries, and thanks to agencies' flexibility for funding, as for previous calls BiodivERsA partners fully respected the outputs of the selection procedure and funded the nine top-ranked proposals.

Scientific and administrative follow-up of the funded projects and dissemination of results

The kick-off meeting of the projects funded by this joint call has been held in Almeria (Spain) on June 13 and 14, 2013. All the funded projects have a duration of 3 years (with possible extension if the need is justified). The scientific and administrative follow-up of projects is performed by the Call Steering Committee with support of the Secretariat of this call located in ETAG (Estonia).

Project results and highlights are disseminated through the BiodivERsA website (http://www.biodiversa.org). In addition, BiodivERsA develops policy briefs around the themes addressed by funded projects once they have sufficiently progressed in order to disseminate hands-on results and key information to European policy-makers and other stakeholders.

Partners:
National Centre for Scientific Research, CNRS, CRIOBE, FRANCE, coordinator
Centre of Marine Sciences of the University of Algarve, CCMAR, PORTUGAL
University of Luleå, ETS, SWEDEN
Institute of Marine Research, IMR, NORWAY
Instituto Superior de Psicologia Aplicada, ISPA, PORTUGAL
Swedish University of Agricultural Sciences, Institute of Marine Research, Lysekil, SWEDEN
Centre for the Law and Economics of the Sea, CNRS, AMURE, FRANCE

Duration: 10-2012 to 09-2015
Total grant: €1 125 316
Further information: Joachim Claudet (joachim.claudet@gmail.com)

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www.biodiversa.org

Projects funded 2011-2012 Call

BUFFER - Partially protected areas as buffers to increase the linked social-ecological resilience

Coastal zones are complex social-ecological systems playing a crucial role in the economic, social and political development of many countries. However, they are amongst the areas of the world experiencing the highest rates of pressures. Recently, some studies showed the potential of multiple-use (or partially protected) areas (PPAs) to sustain higher rates of uses and economic revenues than surrounding areas, and buffer against human-induced pressures.

Within BUFFER, the main objective is the identification of drivers of resilience in PPAs that are keys to sustain, adapt or transform derived goods and services necessary for human welfare in a context of multiple pressures. Some of the key questions BUFFER will address to reach this main objective are:

1) Do PPAs help to buffer against human-induced functional changes in coastal assemblages?

2) Do PPAs help to buffer against human-induced selection pressures and in protecting phenotypic diversity (in relation to adaptations to future environmental change)?

3) Are uses and users (in relation to commercial and recreational fisheries, physical exploitation and scuba-diving, boating, anchoring and snorkeling) less vulnerable in PPAs? Do PPAs provide new opportunities for users?

4) Can global threats on linked coastal social-ecological systems be more easily managed in PPAs?

5) What are the context-dependent drivers of PPA resilience?

Disciplines involved cover ecology, fisheries science, conservation biology, economy, social science, and governance. The selected case studies include marine and freshwater partially protected areas in Europe, spanning across different ecological systems and a diverse array of socio-cultural contexts in order to increase the robustness, generalization, applicability, and transferability to decision-makers of our results. In particular, the research teams will work on marine coasts, fjords and rivers, in France, Norway, Portugal and Sweden. The main activities will be the creation of a PPA typology and the monitoring and assessment of target variables in PPAs compared to open and fully protected areas. Those target variables include functional diversity and redundancy, selection pressures and phenotypic diversity, use opportunities and evolution, and management adaptability and transformability. The communication plan includes the involvement of practitioners and stakeholders through dedicated workshops (including both presentations by scientists and stakeholders), publication of scientific papers and communications in dedicated conferences to reach the scientific community, and transfer to policy- and decision-makers through the edition of a booklet.

CoForTips – Congo basin forests: tipping points for biodiversity conservation and resilience of forested social and ecological systems

The purpose of CoForTips is to foster better management of the Congo Basin forests through 1) a better understanding of the dynamics and regime shifts of biodiversity, and linkages between social and ecological systems and 2) the construction of scenarios of biodiversity, exploring possible futures for the forests and people of the region. The scenarios will explicitly address different management and policy options.

How is biodiversity changing? What are the drivers of environmental change? How will they interact and shape the future of the region? To tackle these questions CoForTips will develop spatially explicit models linking social and ecological processes, and focus on study sites selected along a gradient of human intervention. The project explicitly addresses the need to embed research in the decision making process, and will therefore work in close partnership with the stakeholders and policy makers of the region.

The project is organized in three research components aiming at:

1) Identifying tipping points in the forests of the Congo basin SES, characterising and mapping biodiversity resilience, identifying stable states and tipping points focusing on tree communities and keystone wildlife species.

2) Constructing scenarios of biodiversity, integrating social, economic, governance, ecological and geophysical processes in a platform able to simulate regional trajectories including sensitivity analysis and levels of uncertainty and incorporating feedback loops based on coping strategies developed by stakeholders.

3) Fostering resilience, embedding the results of our research in the decision making process at the regional and national levels, through well-defined impact pathways involving policy makers and the civil society, through participatory construction of scenarios, fostering innovation in forest and biodiversity policy and management.

The project will cover all the countries of the Congo Basin but three sites will be selected for in-depth surveys: Two sites have already been selected: in Cameroon (Dja region) and in Gabon (Makokou region). A third site is under discussion.

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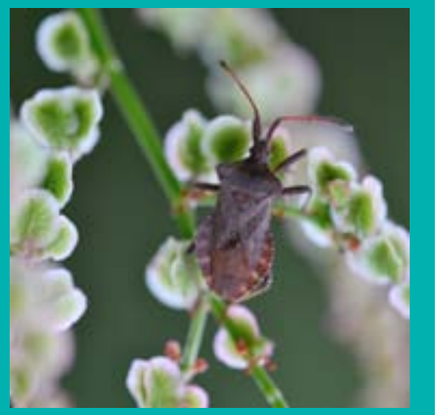

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EC21C – European Conservation for the 21st Century

European biodiversity is threatened by simultaneous and drastic alterations in climate and how we use our land. Animal and plant species, which are driven out of their historic ranges due to changing conditions, may survive if they can find suitable habitats elsewhere. But the European ecosystems we are accustomed to - the systems of species and environments that are characteristically "European" - will be pulled apart as individual species go their separate ways. Society relies on biodiversity for vital services such as crop pollination, carbon storage, and groundwater management. But biodiversity change often results in a loss of vital ecosystem services.

In order to protect biodiversity, and hence our own well-being, we must predict when and where the shifts in the distributions of animal and plant species will disrupt European ecosystems and use these predictions as a basis to evaluate methods for avoiding or mitigating this disruption. One such method currently adopted by European Commission is the concept of Green Infrastructure (GI), a strategically planned network of high quality green spaces and other environmental features such as hedgerows, fish passes or biodiversity-friendly fields.

The main objectives of EC21C are:

1) Study how individual plants and animals will move through typical European landscapes as climate changes.

2) Simulate changes in species distributions throughout Europe under predicted 21st century climate and land-use changes (almost all vertebrates, 20% of plant species, and a representative sample of insects in Europe).

3) Predict when and where European ecosystems and the services they provide might change drastically.

4) Evaluate the potential and limitations of GI for biodiversity conservation and adaptation to environmental change.

At the core of this project is the union of multiple scientific approaches. Models will be used to understand the types of climate and vegetation that each species requires, and then predict where this habitat will be found in the future. The project includes field work and ecological theory to study whether species can move to future habitats, what this means for ecosystem functions, and how GI might assist conservation. Stakeholders (policy makers, farmers, business owners) will be interviewed to quantify the willingness and ability (economic, cultural, political) to implement GI. Finally, project findings and their policy implications will be disseminated to EU policy-makers.

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FISHCON – Biodiversity scenarios for fragmented landscapes; freshwater connectivity and the future of fish diversity

Since ancient times, freshwater ecosystems have provided human society with numerous essential ecosystem goods and services. However, their diverse and increasing use has also resulted in multiple anthropogenic impacts that threaten the functioning of these ecosystems. For example flood protection by levees had cut off most of the historic floodplains and caused significant drop in freshwater fisheries productivity. Freshwaters host ~10% of the world's fauna and one third of all vertebrates, while covering only 0.8% of the earth's surface. Today more than one third of Europe's freshwater fish fauna are classified as threatened by extinction.

Most predictions of how resilient biodiversity is to environmental change ignore how organisms are able to spread between different habitats. Habitat connectivity, the continuity between a species' suitable habitats, is particularly evident for organisms living in freshwater. Here, dispersal barriers imposed by the network structure of freshwater rivers and lakes leads to uneven dispersal among localities, and different species are affected by this in different ways.

The limited connectivity of freshwaters makes them particularly vulnerable to environmental impacts because organisms may not be able to colonize or recolonize streams or lakes even after environmental mitigations and habitat restorations. On the other hand, limited connectivity may have positive effects on biodiversity by hindering invasive species dispersal and thus providing refuges for native fauna in isolated lakes and streams.

FISHCON will investigate the interplay between management and future biodiversity scenarios using freshwater fishes as study organisms. The project's main objectives are to build models for freshwater fishes used in European environmental legislation (EU Water Framework Directive) and to explicitly link present-day management of habitat connectivity to future biodiversity scenarios. While past studies have evaluated suitable future habitats for fishes at the catchment scale, the researchers will combine detailed lake and stream data sets across Germany, Sweden and Norway, hence spanning a latitudinal gradient from 48 to 71 °N. FISHCON will predict future fish distributions both at large scale across Europe, and at small scales covering specific catchments that are relevant for local management.

The project includes collaboration with local managers and stakeholders to identify relevant strategies for managing habitat connectivity within focal catchments. Through this collaboration FISHCON will also investigate how management actions affect biodiversity scenarios.

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LIMNOTIP – Biodiversity dynamics and tipping points in our future freshwater ecosystems

The accelerating loss of biodiversity has affected organisms in all ecosystem types and recent reports suggest that freshwater species are lost at a rate higher than in any other biome. Freshwater ecosystems provide a wide array of ecosystem services for humans, including harvestable goods, water supply, water storage, as well as sites for recreational activities. Nevertheless, freshwater ecosystems have been heavily affected by human activities during the last century, including increasing nutrient loading, habitat destruction and infiltration of pesticides. Eutrophication continues to be a major and severe environmental threat to freshwater ecosystems, and recent studies have suggested that the negative effects of nutrient enrichment on lake algal dynamics may become increasingly problematic as a result of climate change.

In shallow lakes, one of the most important effects of eutrophication is abrupt regime shifts : pristine lakes reach a "tipping point" and change from a clear-water state with lush stands of submerged plants to turbid conditions with dense algal blooms. Reaching such a tipping point generally results in a dramatic decline in biodiversity and, further, the value of the lakes as providers of goods and services. Hence, there is a great challenge for the future in meeting the needs for improved knowledge on the mechanisms behind regime shifts from single system levels to aggregated system levels in freshwater ecosystems and under what circumstances they occur. It is also obvious that freshwater ecosystems are far from isolated, pristine entities, but that they are tightly coupled with human systems and that studies of these social-ecological systems (SES) are of utmost importance if we are to understand our future.

LIMNOTIP addresses the ecological and social mechanisms behind tipping points, biodiversity loss and water resource deterioration in different climate change scenarios. These scenarios will serve as a basis for social-ecological modelling and studies of both land use and management of ecosystem services for different regions in Europe to allow for proactive decision-making. This will be reached by analysis of decadal time series of freshwater ecosystems along a latitudinal gradient of Europe and a follow up of these trends in an experimental study. These studies will allow providing regional-specific recommendations, e.g. assessing whether resilience and rate of biodiversity changes differ between climate zones and between pristine and strongly affected catchments and lakes. The outcome of these empirical studies will, in concert, feed into social-ecological modelling providing scenarios and decision support with a clear and critical empirical validation.

REGARDS – REsilience of marginal GrAsslands and biodiveRsity management Decision Support

European marginal grasslands are biodiversity hot spots owing to ecological constraints, biophysical heterogeneity, and centuries of agriculture. Currently it is not clear whether they are vulnerable to ongoing environmental, socio-economic and political changes, or if they have developed a high resilience over their history of co-evolution between humans and ecosystems. If so, the limits to this resilience are unknown, and their prediction hazardous. This uncertainty lies largely in the poor knowledge of resilience mechanisms of the ecological and human sub-systems, and of the role of land management decisions and ecosystem services to foster robustness or vulnerability.

REGARDS aims to unravel the mechanisms underpinning resilience of marginal grassland systems to environmental and social changes in order to enhance socio-ecological resilience from farm to regional level. The project asks the following questions:

1) Can we identify dangerous thresholds in the combined effects of changing climate, including extremes, and management on grassland ecosystems?

2) How does coupled plant-soil biodiversity determine such responses?

3) How do landscape structures affect the resilience of ecosystem services?

4) Can multi-level governance facilitate fast adaptation to socioeconomic changes that affect biodiversity and the related ecosystem services?

5) Do regional integration and globalization modify resilience through their effects on flows of goods and ecosystem services, people and information?

6) How do ecological and human processes combine to determine resilience of ecosystem services?

REGARDS will address these questions for mountain grassland sites (Austria, France, Norway) with contrasted biophysical and human situations. Questions (1) and (2) will be addressed using field experiments. Historical analysis over the last 60 years will be used to quantify landscape functional structure and its effects on ecosystem services (question 3). Question (4) will be addressed by an assessment of how local, regional, national and EU programs affect farmers responses and resilience. Question (5) will be addressed by reconstructing exchanges with other regions of each site. A participative scenario-based approach will evaluate likely thresholds in terms of biodiversity, ecosystem services, material well-being (question 6). Outcomes will be used to foster knowledge building about resilience at farm and local/regional levels.

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SIGNAL – European gradients of resilience in the face of climate extremes

Meadows and pastures encountered in Europe provide various ecosystem services which have a crucial influence on the human well-being. However, extreme weather events and the presence of invasive species can act as pressures threatening biodiversity, resilience and ecosystem services of semi-natural grasslands and can suddenly drive them beyond thresholds of system integrity (tipping points and regime shift). On the other hand, biodiversity itself may buffer against change. Potential stabilising mechanisms include species richness, presence of key species, and within species genetic diversity. These potential buffers can be promoted by conservation management and political decisions.

SIGNAL will investigate mechanisms of resilience in European grassland prone to novel climate extremes and identify early warning signals of thresholds and regime shifts by installation of replicated experimental manipulations of climate extremes at eight grassland sites across Europe (Belgium, Bulgaria, France, Germany, Hungary, Italy, Switzerland and Turkey). Thus, the central aim of the SIGNAL project is to create a basis to test prospective implementations in environmental management and nature protection on their efficiency. In view of changing forecasts for climate and weather, new instruments for the protection of ecosystem services of open space have to be generated.

SIGNAL investigates the interaction of three major research directions which have not yet been combined: biodiversity experiments, climate impact research, and invasion research. The specific question is how droughts change the biodiversity and ecosystem service provision of grassland with the focus on invasive species and their settling. On this basis, science-based policy recommendations are to be developed, for example for European or national authorities, non-governmental organizations (NGOs) or for agriculture and forestry. The platform of National Consortia (PNC) plays an important role in this process. This forum consists of the national consortia of the countries, which are engaged in national biodiversity goals. At each consortia, there are not only representatives of politics and ecological practice but also scientists participating in SIGNAL. They will be responsible for the transfer of the research results.

TIPPINGPOND – Tipping points, biodiversity, resilience and ecosystem service: Pond as model systems

Ponds and shallow lakes are very important for regional biodiversity and strongly contribute to ecosystem services such as carbon storage, recreation and fish production. In addition, they are excellent model systems in ecology, and have played a key role in the development of theory on regime shifts in ecosystems, where initial resilience to environmental change leads to catastrophic regime shifts when a disturbance threshold is surpassed. Upon eutrophication or with temperature increase, ponds and lakes may show a shift from a clear-water to a turbid state with an associated decline in biodiversity and ecosystem services.

TIPPINGPOND engages in a combined survey and manipulative study to identify the link between extant biodiversity and resilience to disturbance in pond ecosystems and early warning signs of regime shifts that lead to a strong decline in biodiversity and ecosystem services. Field experiments and studies will take place in Belgium, France and Sweden, on natural lakes and ponds.

Our approach is fourfold. TIPPINGPOND will:

1) Engage in large-scale field experiments. Using enclosures, we will expose resident communities to well-defined disturbances (e.g. increases in nutrient concentrations and temperature mimicking the combined effect of eutrophication and climate change) and monitor ecosystem resilience as a function of biodiversity;

2) Monitor community and ecosystem dynamics in response to experimental disturbances to identify early warning signals;

3) Validate the experimental results on data from field surveys on natural as well as fish culture ponds in France, Belgium and Sweden, linking biodiversity to ecosystem functions;

4) Validate hypotheses generated from field data in highly standardized laboratory systems (Planktotrons).

The legacy of TIPPINGPOND will be: (1) Insights into the relationship between biodiversity and resilience to disturbance, providing key information to safeguard ecological integrity of freshwater habitats. These insights will be validated in a broad range of standing waters, informing predictions and generate policy value beyond ponds as model systems. (2) A deeper understanding of tipping points and early warning signs for regime shifts in aquatic systems. Stakeholders targeted by the project include policy makers, nature conservation organisations, and applied ecology institutes.

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TipTree – Scenarios for forest biodiversity dynamics under global change in Europe: Identifying micro-evolutionary scale tipping points

Predicting the response of forest trees to ongoing global change is a critical ecological, societal and economic issue. Indeed, forests cover nearly 40% of Europe and around 23% of emerged land worldwide and most "hot spots" of biological diversity (where biodiversity is both high and vulnerable) are actually forests. Besides biodiversity sustainability, forests provide a multiple source of ecosystem services and well-being to human populations, including carbon sequestration and freshwater availability.

Impacts of climate and land-use changes on forests are expected to be acute. Environmental tipping points may be reached where tree populations collapse suddenly with irreversible effects on ecosystem functioning. Adaptive potential could nonetheless be high in tree populations: besides tracking their ecological niche spatially through migration (without adapting), tree populations could adapt to the ongoing climate change (CC) in the short-term through individual physiological tolerance (plasticity), and/or in the longer term through evolutionary response to climate-induced selection. However, observed and predicted rates of climate and environmental changes, far above past natural oscillations, raise the issue of how quickly tree species can adapt to CC.

TipTree will investigate to what extent trees have the evolutionary potential to adapt to ongoing CC, evaluate the existence of tipping points in adaptive genetic diversity below which adaptation to degraded environments is not possible anymore, and assess how human actions interfere in the adjustment between the rate of evolution and the velocity of CC. A main originality of Tiptree is to investigate tree abilities of rapid adaptation (in 1 to 10 generations), in different parts of the range (and in particular in warm margins where tipping points are most expected). Another originality is to rely on a new generation of simulations models accounting for key environmental, ecological and genetic processes.

Using these models, TipTree will investigate the demographic and evolutionary dynamics of tree populations for a range of forest management scenarios established by our stakeholder group and under scenarios of CC provided by IPCC. These simulations will provide forecasts of tree persistence, ecosystem services (carbon sequestration, wood production, sustain of forest cover for recreation) and decision support for management.

Perspectives for BiodivERsA

BiodivERsA has pursued its goal of launching annual calls and has implemented its fourth call in November 2012 on « Invasive species and biological invasions ». This call involves 12 agencies from 10 countries. Further information on this call is available at http://www.biodiversa.org/367.

Year after year, the projects funded by BiodivERsA demonstrate the willingness of our network to promote pan-European cooperation and fund excellent research projects in terms of both scientific quality and societal relevance. Apart from the regular launch of joint calls, BiodivERsA continues to perform analysis of the biodiversity research landscape, through its database (http://data.biodiversa.org) that now includes information on more than 6500 funded projects, meetings, and reports on biodiversity research strategies at national and international levels, stakeholder engagement in research projects, etc.

Based on this experience, the network is well grounded as a key player for supporting biodiversity research in Europe, promoting openness, interdisciplinarity and stakeholder engagement. This will provide new knowledge and hands-on solutions for tackling biodiversity loss and ecosystem degradation.

With the development of a strategic and multi-annual vision of the network's priorities, and the annual launch of joint calls for research projects to implement this strategy, BiodivERsA partners are thoroughly pursuing the network's overall goal: to build a sustainable funding platform for an innovative and interdisciplinary biodiversity research responding to pressing societal and policy needs at the European level.

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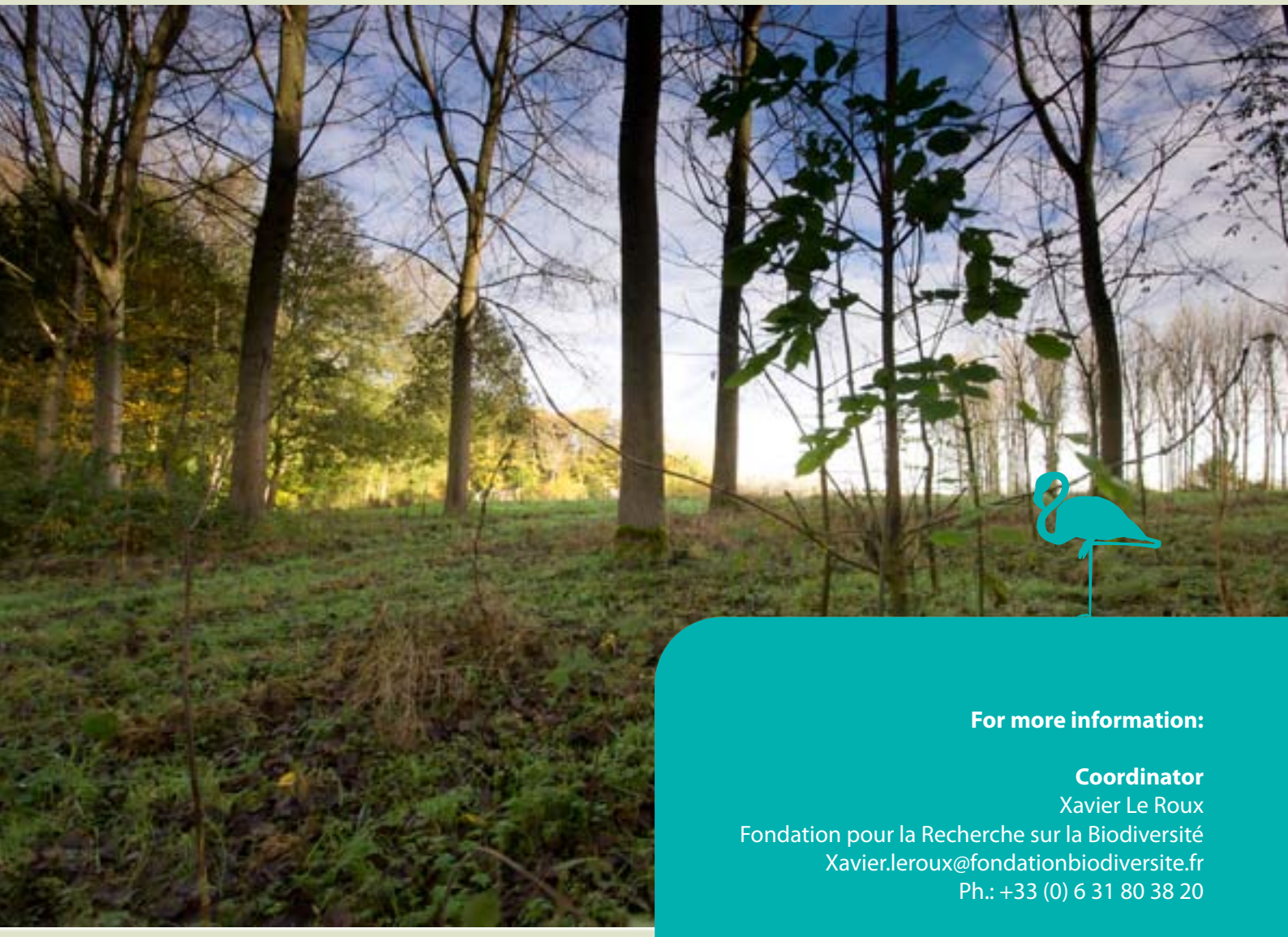

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SEVENTH FRAMEWORK PROGRAMME

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