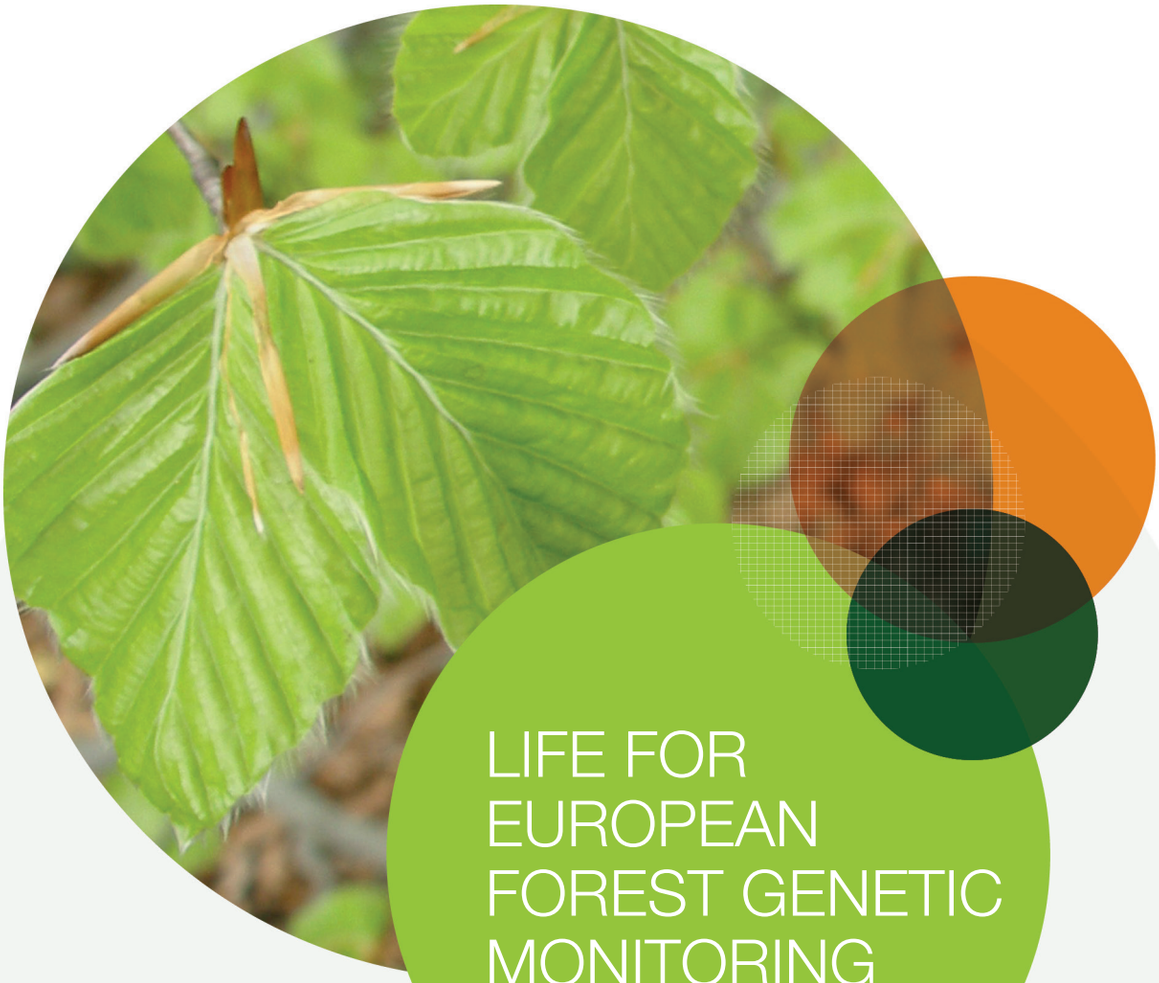

LIFE FOR EUROPEAN FOREST GENETIC MONITORING SYSTEM

LIFEGENMON Mid-term Report

Short version

Covering project activities from
July 1st, 2014 to December 31st, 2017

Reporting Date: **31st March 2018**

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Project is financially supported by the European Union's LIFE financial mechanism.

LIFEGENMON – LIFE FOR EUROPEAN FOREST GENETIC MONITORING SYSTEM

Project Data

Project location: **Slovenia, Germany, Greece**

Project start date: **1 July 2014**

Project end date: **30 June 2020**

Total budget: **5,484,162 €**

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(%) of eligible costs: **49.87%**

Data Beneficiary

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LIFE FOR EUROPEAN FOREST GENETIC MONITORING SYSTEM

Slovenia:

GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE

Slovenian Forestry Institute
(coordinating beneficiary)

ZAVOD za GOZDOVE SLOVENIJE

Slovenia Forest Service

CNVOS
Centre for Information Service, Co-operation and Development of NGO

Centre for Information Service, Co-operation and Development of NGOs

Greece:

Aristotle University of Thessaloniki, Faculty of Forestry and Natural Environment

Hellenic Republic - Decentralized Administration of Macedonia & Thrace General Directorate of Forests & Rural Affairs

Germany:

ASP BAYERISCHES AMT FÜR FORSTLICHE SAAT- UND PFLANZENZUCHT

Bavarian Office for Forest Seeding and Planting

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Short description of the project LIFEGENMON

Sustainable forest management is based on the long-term adaptability of forest ecosystems, which is highly dependent on biodiversity. Biodiversity starts at the lowest level, namely, the level of the gene. Forest genetic monitoring is therefore a crucial component of any sustainable forest management as it provides the possibility to detect potentially harmful changes in forest adaptability before they are seen on higher levels. Forest genetic resources face a large number of increasing threats. By introducing genetic monitoring into conservation programmes and sustainable forest management, we have the tool in hand to assess information on relevant changes of a species' and / or population's adaptive and neutral genetic variation through time. Based on indicators and their verifiers it can serve as an early warning system to aid the assessment of a species response to environmental change on a long-term temporal scale.
The aim of the LIFEGENMON project is the development of a system for European forest genetic monitoring to support the long-term maintenance of adaptability of forest genetic resources to the changing environment. The project is co-funded by the European Union's LIFE+ programme (the Financial Instrument for the Environment) and national funding sources. It combines the efforts of six partners from three European countries (Germany, Greece and Slovenia). It is coordinated by Prof. Dr. Hojka Kraigher from the Slovenian Forestry Institute and lasts from July 2014 until June 2020. The total budget is €5,484,162.

The aims of the project

- To define optimal indicators and verifiers for monitoring of genetic diversity changes in time across a transect from Bavaria to Greece for two selected target species, a stand-forming broadleaf and a stand-forming coniferous species;
- To prepare guidelines for forest genetic monitoring for these two and an additional five forest trees species, which differ in their biology and distribution, for implementation of forest genetic monitoring at a national, regional and EU scale;
- To prepare a Manual for Forest Genetic Monitoring for implementation at the national and the EU level;
- To prepare a decision support system for an optimal choice of the level of forest genetic monitoring based on needs and means;
- To organize a series of workshops and training sessions for the forestry sector to be capable of implementing forest genetic monitoring according to standardized procedures in their territories;
- To prepare background professional documents/guidelines for policymakers at the national, regional and the EU level for supporting development of possible new regulations at the national level, the FOREST Europe process and future European forestry and biodiversity conservation policies and strategies;
- To discuss and disseminate forest genetic monitoring among different target audiences and stakeholders to promote the use and results of this early warning system as a tool for sustainable forest management;
- To establish a well-functioning, internationally linked team of forestry professionals working in and for forest genetic monitoring.

Expected results of the project

- Genetic monitoring regions delineated for seven species or species complexes within the transect countries;
- Six genetic monitoring sites installed in three countries, two sites per country, one for *Fagus sylvatica,* one for *Abies alba/Abies borisii-regis*;
- Database developed for storing demographic and genetic data, including raw genetic data;
- Minimum and optimal number of indicators and verifiers defined for three monitoring levels (mid-term and updated by the end of the project);
- Cost estimation of genetic monitoring per species/level/indicator assessed (as part of the Manual for Forest Genetic Monitoring);
- Protocols for collecting demographic & genetic data standardized;
- Species/species group specific guidelines and strategies established for the European forest genetic monitoring system;
- A written handbook entitled Manual for Forest Genetic Monitoring published, containing practical advice on forest genetic monitoring including implications for sustainable forest management;
- A decision support system prepared.

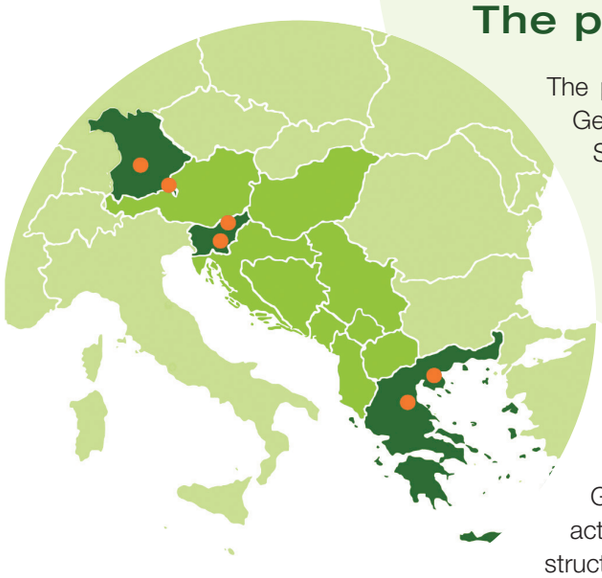
Report on background documents for support preparation of modifications of existing and proposals for new regulations at the national and at the European scale will be facilitated, streamlined and harmonized, based on the information and results generated by workshops involving stakeholders and policymakers.

The achieved goals of the actions will provide a solid background for the preparation of future strategies for application of forest genetic monitoring to halt biodiversity loss at a pan-European scale. Unified strategies will help to overcome methodological and political difficulties due to national initiatives (national specificities/characteristics).

Results of genetic monitoring will directly lead to practical forest management actions by using the detailed decision support system. The long-term development of range-wide conservation will be ensured by congruent European-scale strategies for forest trees and by the implementation of a European-wide forest genetic monitoring system.

Access to all information sources can be obtained on the internet and/or in libraries. When appropriate, existing monitoring plots and data will be accessed via web portals or data curators. If requested, data will be transferred to the European Forest Data Centre of the Joint Research Centre of the European Commission, for public dissemination.

The project team and actions



The project team is made up of six project partners from three countries: Germany, Greece and Slovenia. The consortium is coordinated by the Slovenian Forestry Institute (SFI), with associated beneficiaries being the Slovenia Forest Service (SFS), Centre for Information Service, Co-operation and Development of NGOs (CNVOS), Bavarian Office for Forest Seeding and Planting (ASP), Aristotle University of Thessaloniki and General Directorate of Forests and Agricultural Affairs – Decentralized Administration of Macedonia - Thrace (GDDAY-DAMT).

The actions comprise Preparatory Actions A; Implementation Actions B: Defining optimal indicators and verifiers, Guidelines and management strategies and policy guidelines; (C), Monitoring of the impact of the project actions; (D), Communication and dissemination actions; (D) General dissemination and targeted dissemination; and (E) Management action dedicated to Advisory Board activities and networking, management structure and procedures, after-LIFE communication plan and final audit.

Description of background, problem and objectives

Issue addressed

Forest genetic resources face a large number of increasing threats despite the overall forested area remaining fairly stable (European Environmental Agency 2010). Climate change, air pollution, unsustainable forest management, invasive species, urbanization and forest fragmentation reduce forest biodiversity, may adversely affect genetic diversity and place at risk the future adaptive potential and sustainability of European forests. An early warning system is needed In order to ensure the maintenance of genetic variation in natural forest tree populations, as subtle but significant adverse changes may not be visible to the naked eye for years. Genetic monitoring is designed to do just that.

Our hypothesis

Several studies have defined the need for genetic monitoring in order to quantify relevant changes regarding long-term adaptability of a species (Aravanopoulos 2011), or to assess the dynamics of transition from the present to the future genetic status of a forest stand (Konnert et al. 2011). Genetic monitoring enables the observation of temporal changes in populations and therefore relevant components can be inferred and consequences evaluated. Hence, genetic monitoring includes a prognostic value as well as representing a method to secure the conservation of processes that maintain genetic variation in natural populations (Aravanopoulos 2011).

Approach taken

Sustainable forest management is based on the long-term adaptability of forest ecosystems and starts at the lowest level, namely the level of the gene. Forest genetic monitoring is therefore a crucial component of any sustainable forest management as it provides the possibility to detect potentially harmful changes in forest adaptability before they are seen on higher levels.

Project tasks:

- define optimal indicators and verifiers for monitoring of genetic diversity changes in time across a transect from Bavaria to Greece for selected target species (*Fagus sylvatica, Abies alba/Abies borisii-regis*),
- prepare guidelines for forest genetic monitoring for selected target species and an additional five forest tree species, for implementation of forest genetic monitoring at a national, regional and EU scale,
- prepare a Manual for Forest Genetic Monitoring for implementation at the EU level,
- prepare a decision support system for an optimal choice of the level of forest genetic monitoring based on needs and means,
- organize a series of workshops and training sessions so that the forestry sector will be capable of implementing forest genetic monitoring according to standardized procedures in their territories,
- prepare background professional documents/guidelines for policymakers at the national, regional and the EU level for supporting development of possible new regulations at the national level, the FOREST Europe process and future European forestry and biodiversity conservation policies and strategies,
- discuss and disseminate the concept and findings of forest genetic monitoring among target audiences and stakeholders to promote the use and results of this early warning system as a tool for sustainable forest management,
- establish a well-functioning internationally linked team of forestry professionals working in and for forest genetic monitoring.

Expected long-term results and benefits

Over the long term, forest genetic monitoring should enable improved adaptive forest management to enhance the resilience of forests to climate change. Resilient forests will be able to continue to provide ecosystem services expected by society alongside conservation of biodiversity.

Environmental benefits

Direct/quantitative environmental benefits:

Six forest genetic monitoring plots, or two per country, have been established, initiating and contributing to the overall goal of the project, development of the system for forest genetic monitoring. During the selection process heavy overgrazing by wildlife and its negative impact on fir regeneration was detected and its consequences signalized to forestry officials and the general public, strengthening the communication with hunters' organizations. The indicators and verifiers have been reviewed, the first testing round finalized, and the protocols for ring tests established, thus standardizing the procedures and allowing comparability among different molecular labs working in forest genetic diversity assessment, and for inclusion into the Manual. The implemented forest genetic monitoring on the six plots will provide procedures (the Manual) that have been tested and evaluated and could be directly used to monitor the state of and changes in genetic diversity in the European Genetic Conservation Units, in line with the pan-European strategy for genetic conservation of forest trees[1], directly contributing to the conservation and sustainable management of European biodiversity.

Relevance for environmentally significant issues and policy areas:

The communication plan on the role of forest genetic diversity in sustainability of forests, and the initiation of the forest genetic monitoring system by forestry policymakers have been prepared in Germany to be applied and further developed in the other two participating countries as well as in the transect countries. In particular, large-scale disturbances and climate change effects on the future distribution of forest trees, and thus the existence of forests in future climates, have been communicated at the national levels. Thus, in the coordinating beneficiary partner country, Slovenia, a target developmental project has been launched, confirming the effectiveness of the policy-oriented communication plan. Also, the EU access to and benefit sharing regulation (based on the Nagoya protocol) has been considered as relevant for forest genetic resources, and representatives nominated to the national committee on its execution at the national level. Furthermore, the development of the forest genetic monitoring system contributes directly to all activities within the European Forest Genetic Resources Programme (EUFORGEN) and its inputs to the FOREST EUROPE process, as well as to fulfilling the EU biodiversity strategy and its action plan up to 2020.

Further, the monitoring implemented and the procedures prepared for its further implementation (the Manual) will contribute directly to the fulfilment of Article 7 of the Convention on Biological Diversity. By improving understanding of genetic diversity in forests, LIFEGENMON will also contribute to the Aichi targets, Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity and UN Sustainable Development Goals, in particular Goal 15: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss.

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[1] Sven M. G. de Vries; Murat Alan; Michele Bozzano; Václav Buriánek; Eric Collin; Joan Cottrell; Mladen Ivankovic; Colin Kelleher; Jarkko Koskela; Peter Rotach; Lorenzo Vietto; Leena Yrjänä. 2015. Pan-European strategy for genetic conservation of forest trees and establishment of a core network of dynamic conservation units. European Forest Genetic Resources Programme (EUFORGEN), Bioversity International, Rome, Italy.

At national levels forest genetic monitoring will contribute directly to achievement of sustainable forest management and biodiversity conservation stipulated by i) the Resolution on the National Forest Programme (2007), Forest Act (1993), Act on Forest Reproductive Material (2002), Act on Nature Conservation (1999) and the Biodiversity Conservation Strategy of Slovenia (2002) in Slovenia; ii) German National Strategy on Biodiversity (2007), Federal Nature Conservation Act (2009), Forest Strategy 2020 (2011), Regional Forest Laws (e.g. Waldgesetz für Bayern (2005)), German Federal Act on Forest Reproductive Material (2002), Concept for the Conservation and Sustainable Utilization of Forest Genetic Resources in the Federal Republic of Germany (2010) in Germany and iii) Law 3937/2011 'Preservation of biodiversity and other provisions', Laws 1650/1986 and 3937/2011 on Nature Protection, Presidential Decree 86/1969 'Forest Code', Law 998/1979 'On the protection of forests and forest areas of the country', Presidential Decree 80/1990 and Law 3165/2003 on the conservation and protection of the plant genetic resources of the country, Presidential Decree 67/1981 on the protection of autochthonous and wild flora, Law 3208/2003 'Protection of forest ecosystems, establishment of forest cadaster, regulation of legal rights on forests and forest areas and other provisions', Laws 996/1971 and 1650/1986 provisions on the establishment of national parks, aesthetic parks, natural monuments, Law 1650/1986 on nature conservation, areas of absolute nature conservation and protected natural formations and landscapes, Laws 177/1975 and 2637/1998 on refuges for wildlife in Greece.

Long-term benefits and sustainability

Long-term qualitative environmental benefits

Forest genetic monitoring will provide an insight into the current state as well as trends of changes in genetic diversity in a given forest population over a long period of time, initially substituting the long-term data series with replacement of three generations in the same forest (adult trees, seedlings, seed). The changes in the indicators observed will alert foresters to any change underway, allowing for early intervention if the change should be in a negative direction. Therefore, forest genetic monitoring will over the long term enable improved adaptive forest management for more resilient forests to climate change effects.

Long-term qualitative economic benefits

Genetically diverse and therefore more resilient forests allow for better fulfilment of the ecosystem services that society expects forests to provide, from production to environmental ones, including conservation of biodiversity. Higher genetic diversity allows for the spread of the risks posed by climate change. Insight into genetic diversity through time will enable economic valuation of genetic diversity for the fulfilment of ecosystem services of forests.

Through implementation actions, the monitoring itself is discussed with forestry professionals and policymakers, the former also being project partners in looking for solutions on how to incorporate recordings for the most informative verifiers into the daily work of forestry professionals to be compatible with the current work and budgets of forestry services or increased budgets through policy change. The goal is to produce a self-sustainable monitoring system at the national level without relying on occasional project funding.

Long-term qualitative social benefits

Social benefits are also based on ecosystem services that more resilient forests can provide over the long term. FAO estimates that over 2.4 billion people worldwide depend on forest goods and services for provision of food, wood fuel, building materials, medicines, employment and cash income. This makes resilience of future forests fundamental to the livelihoods of a significant portion of the human population. The transferability and replicability of LIFEGENMON results is an important factor in assuring future social benefits such as rural community resilience (job creation, protected homes, lives and livelihoods) and preservation of recreational, historical and cultural resources of forests so that they can be enjoyed by future generations.

Continuation of the project actions

The policymakers' communication action plan, all communication and dissemination activities and networking are aimed at preparation of the after-LIFE communication plan and its long-term effects and impacts. This includes continuation of monitoring activities on the established monitoring plots. The dissemination activities to children are designed to increase awareness of the importance of forests and diversity for more sustainable use of resources, including forests, in the future, aiming at self-sustenance and growth of interest in forests and genetic diversity by these younger generations.

Replicability, demonstration, transferability, cooperation

Replicability

The project activities are aimed at the national and regional level with a view to serve as a demonstration project to be repeated/implemented primarily in genetic conservation units at the pan-European scale. All monitoring procedures will be collected in the Manual, which will contain techniques to enable replication of the monitoring procedures beyond the beneficiary countries. With time the model could be implemented globally, especially considering highly diverse but endangered tropical forests to provide early warning of changes that might extirpate certain populations or even entire tree species.

Demonstration value

The project is preparing the basis for a future forest genetic monitoring system at the national, regional and EU scales, promoting implementation and enforcement of national and EC environmental legislation and biodiversity initiatives, and improving the knowledge base for forest strategies and biodiversity policies in the area. Particularly applicable will be the output 'decision support system' for policymakers to decide on the needs and means for which level of forest genetic monitoring to apply at the national scale. Furthermore, the strong emphasis on dissemination will encourage a better understanding of forestry and the role of forest genetic diversity and its monitoring among different stakeholders and the general public.

Transferability

The project activities are aimed at the national level in the three partner countries, and aimed at the regional level of South East Europe, with a view to serve as a case project and system at the pan-European scale.

Cooperation

LIFEGENMON has actively cooperated with other LIFE projects (LIFE ARTEMIS; LIFE SLOVENIA, LIFE DINALPBEAR, LIFE MANFOR C.BD) as well as other relevant EU projects (GENTREE) and programmes (EUFORGEN, SIFORGEN, INFORMED, AFORGEN, etc.), enabling the creation of synergies in the area of state-of-the-art knowledge transfer and intensive stakeholder involvement. Moreover, LIFEGENMON has collaborated with forest pedagogical initiatives, preparing materials for learning and play in forests for teachers.

Best practice lessons

1. We have included the forest services in the project partnership. In so doing we have ensured close cooperation and involvement of future forest genetic monitoring implementation professionals in all steps of preparatory actions, implementation actions and dissemination/networking actions. Personal involvement in the formation

of the forest genetic monitoring concept and procedures will provide understanding and knowledge for these professionals, who will be more inclined towards forest genetic monitoring implementation in practice.

2. We are accelerating understanding and implementation of forest genetic monitoring by capitalizing on the existing scientific knowledge from networks and projects at the EU and global level.
3. We are continuously working in close cooperation with policymakers by including them in the Advisory Board. We have incorporated targeted forest genetic monitoring and conservation approaches in light of climatic change into public and policy dialogue and decision-making, in this way keeping them informed on the progress of the project, building their understanding of the importance of forest genetic monitoring and preparing the field for support during implementation.
4. We are raising awareness, especially among young audiences, who will shape future policies.
5. We have integrated experienced PR personnel to improve communication skills of experts and prepare tailored messages for specific target groups. This practice has increased the clarity of our messages.

Innovation and demonstration value

Innovation value:

1. Dissemination approaches used to communicate the project are highly innovative not just within the forest genetic resources conservation arena but even more widely, as the children's books were nominated for the award "WEBSI - spletni prvaki" (WEBSI - online champion), organized by the Institute for Digital Excellence in Slovenia: Children's Books with Augmented Reality, Seed Hunter Mobile App.
2. The proof of the principle of the genetic monitoring concept.
3. The potential of re-evaluation of forest management plans based on forest genetic monitoring principles for future sustainable forest management.
4. Development and testing of temporal scale procedures ready to be implemented for management and conservation of forest genetic resources.

Demonstration value:

1. Building of the early warning system (forest genetic monitoring) from the concept level to detailed guidelines for demonstration/implementation, using the capacities of scientists, professionals, policymakers and existing networks.
2. The established monitoring plots serve as a model for the selection and establishment of monitoring plots in other countries and for other species.
3. EU funding enabled the cooperation of three countries on a topic that will be applied at the national level.
4. The involvement of the transect countries' representatives and their information in the region represents an invaluable contribution to all the outputs of the project.

General progress

Preparatory action, project management and networking

The project LIFEGENMON - LIFE for European Forest Genetic Monitoring System – started with an intensive schedule on July 1st 2014. The first Technical Board and Kick-off Advisory Board were organized in Teisendorf, Germany, in mid-July 2014, when the technical and financial rules for LIFE projects were presented by the coordinating beneficiary partner and accepted by all beneficiaries. Also, the Advisory Board was formed at the very beginning of the project, due to organizational activities that had already started before the project contract was signed.

Immediately after the first Advisory Board meeting the transect drive from Bavaria to Greece was organized for beneficiary partner representatives, and led by country experts from national focal points. The transect drive was of utmost importance for the project team to obtain firsthand information about the state of forests, forestry, forest legislation and the state of forest genetic resources in the region in which forest genetic monitoring is proposed for implementation. However, since some partners could not join the July 2014 transect drive, and since not all countries/regions could be visited, a continuation of this drive was organized in early July 2015. During the July 2014 drive, ministry representatives from BiH and Serbia were met with, and plots in BiH, Vojvodina, FYROM and Greece were visited. In July 2015 ministry representatives from FYROM and Croatia were met with, and plots in Central Serbia, eastern BiH, Croatia, Hungary and Slovenia were visited.

Closely linked to the preparatory action were all other actions, particularly management, and by M9 all management activities had already been transferred to the management action, including the organization of the 2nd Advisory Board meeting in early March 2015 in Thessaloniki, the 3rd Advisory Board meeting in September 2016, while the 4th Advisory Board meeting was scheduled for February 2018. Technical Board meetings are organized a day before the Advisory Board meeting.

Associated beneficiary partner financial representatives and persons responsible for actions were designated, and reporting procedures between beneficiary partners and between the coordinating beneficiary partner, the external evaluator and the LIFE team were included into the standard operating procedures for project management. These activities were done in close cooperation with the action Monitoring of the impact of the project actions, led by associated beneficiary partner CNVOS. Furthermore, the project communication system (4th office), also needed for monitoring, was established.

The activities foreseen in the management action were promptly undertaken, and the Advisory Board and networking have enabled extensive cooperation along the transect area (national focal points of the Advisory Board), as well as the forest genetic monitoring scientific community at the pan-EU level (EUFORGEN Scientific Committee representatives in the Advisory Board), while project management and monitoring through day-to-day activities ensures the smooth implementation of this six-year project consisting of over 30 implementation and over 25 dissemination and networking sub-tasks.

In the preparatory action, the list of national legislation for all countries from Germany to Greece as well as European strategies and legislative documents important for forest genetic resources were collected, a general overview of forest genetic monitoring regions was prepared, with indicators and verifiers selected and potential monitoring plots in all three participating countries proposed, visited, and selected. The review paper “FOREST GENETIC MONITORING: AN OVERVIEW OF CONCEPTS AND DEFINITIONS” was prepared and published in the Journal “Environmental Monitoring and Assessment”.

Implementation actions

As part of the B1 implementation action, the project monitoring regions have been successfully defined and the selection of genetic monitoring sites for two species (*Fagus sylvatica, Abies alba/Abies borisii-regis* complex) has been successfully accomplished. Common protocols for demographic assessment have been determined and tested. Demographic assessment has been carried out. Phenology phases assessment has been ongoing on a yearly basis since the beginning of the project and will continue for the project duration. Field sampling for DNA extraction has been completed (1st project genetic monitoring assessment). Standardization of the genetic data across partners has been achieved through common protocols, sample standards and especially through the performance of successful ring tests. The initial selection of genetic parameters for the genetic monitoring indicators and verifiers has been completed and has led to the first laboratory assessment and analysis of field samples, which has also been completed. In total, 5100 samples have been analysed in silver fir and beech. All loci used for the genetic assessment were polymorphic. Some of the tested verifiers did not significantly differ among cohorts in the two species; however, in some others different results among studied cohorts within each population/forest genetic monitoring plot were detected. These results will be counted against those of the second assessment foreseen in 2019 to evaluate fully the genetic monitoring results. In general, results are in line with other published studies of the same species within their distribution range and reveal ample genetic variation. Single nucleotide polymorphism (SNP) analysis is to commence, and the experiment has been set up to include 144 SNPs/188 samples per country for beech and 267 SNPs/188 samples per country for silver fir. All of the above indicate the generation of a vast amount of data, for which a database has been developed. Its library has been discussed and finalized and the database itself has been deployed. Cost analysis is in progress and has proven to be a complex and crucial exercise, especially regarding the analytical description of costs and time requirements for all partners in the same manner. Based on the cost assessment and the information capacity of different indicators and verifiers, their final selection will be made and the development of a decision support system for genetic monitoring will be facilitated.

The implementation action B2 started in autumn 2015 with a review of existing concepts in forest genetic monitoring through a review paper. Another review was prepared on existing forest management practices and monitoring sites through a second review paper. The standardization of protocols as part of the final guidelines has been finalized and the optimization for three different levels is ongoing. The extension of the established protocols for field measurements and lab work done for *Abies alba* and *Fagus sylvatica* is underway for the additional five selected species. Species leaders and the structure of each chapter have been defined. Close cooperation with a Horizon 2020 financed project (GENTREE) as well as with European Forest Genetic Resources Programme (EUFORGEN) activities helps to promote genetic monitoring at the pan-European scale. Important basic materials (criteria for selecting monitoring regions, forest genetic monitoring plot selection procedure, forest genetic monitoring plot description) for the manual have been finalized. Activities regarding implementation and training started with discussion workshops with the forest services and continued with the presentation of the project objectives to target audiences at internal workshops as well as at management/planning meetings of forest services and officers involved in management and planning. Through the organization of a common workshop between LIFEGENMON and GENTREE projects, a further step in ensuring practitioners' cooperation in genetic monitoring implementation has been taken. The workshop has been dedicated to discussion among scientists and forest practitioners on how best to implement genetic monitoring. These discussions will be followed up by workshops at the national level in 2018 and 2019 with the participation of foresters that will implement the genetic monitoring in order to best prepare the guidelines and ensure cooperation of the target groups that will be implementing the genetic monitoring on a daily basis.

Action B3 aims at establishing communication with policymakers to raise awareness on the importance of forest genetic monitoring, through discussion and preparation of an action plan and of background policy documents. It comprises three sub-actions: i) Formation of an action plan, ii) Preparation of draft professional background documents intended for submission to the responsible legislative national bodies/policymakers and iii) Preparation of background professional/expert documents for upscaling of genetic monitoring from the national to the European

scale. The work is done in close collaboration with stakeholders and is supported by the NFPs and other experts. The inclusion of stakeholders among project partners as well helps to identify possible issues not considered in the compiled literature or existing legislation, resolutions and strategies, enables direct communication and testing of proposed solutions, and creates innovative ideas for better future strategies and legislation. The communication action plan has been prepared as a flexible outline so as to adapt to development and circumstances at the national level and is to be further operationalized throughout the project duration through constant interaction and discussion with policymakers. Ongoing discussion with policymakers (i.e. regular meetings with the nominated committees and representatives at the Ministry of Agriculture, Food and Forestry in Slovenia, regular monthly meetings of the director of the project partner ASP with the Bavarian ministry responsible for forests, and the combined role of the partner GDDAY DAMT as a forestry service and a decentralized forest ministry, and communication with the Hellenic national ministry) is increasing awareness of the importance and implications of genetic monitoring. The need for and advantages of genetic monitoring were presented and discussed at the EC DG SANTE WG on Forest Reproductive Material in Arcachon (the next one in 2018 to be organized in Slovenia with the support of the LIFEGENMON team), and at the Scientific Committee of the European Forest Genetic Resources Programme (EUFORGEN) in Amsterdam, while representatives of policymakers also attended a stakeholders' event on genetic monitoring in Thessaloniki, all in 2017.

Monitoring of project implementation

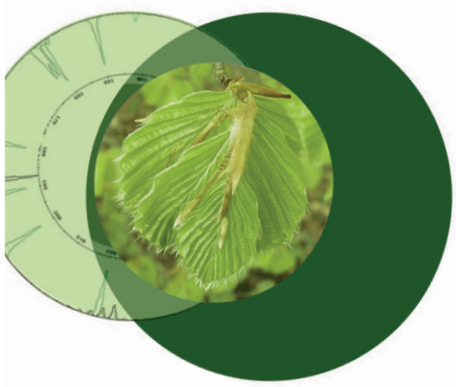
Monitoring activities started as planned on the 1st of July, 2014 by setting up a monitoring matrix and protocol as a foundation for monitoring of all project activities and their impact. The documents were prepared by T. Michieli and T. Divjak and then revised when V. Vodlan took over day-to-day monitoring of the project in April 2015.

Monitoring of the project is done on a regular basis, and special technical meetings with the project coordinator, project manager and/or action leaders were organized (face-to-face when possible and by Skype). Due to a large number of dissemination events Vodlan became part of the dissemination team and is included in all communication. This enables her to continuously follow the progress made and to provide consultancy and possible improvements when activities are still in the preparation phase. The monitoring of the preparatory action has been completed while the monitoring of implementation actions under B is done by regular meetings (Skype and face-to-face) with action leaders and other staff involved in the implementation.

Communication and dissemination action

The actions with the most activities planned and carried out were the dissemination actions, led by the dissemination manager and corresponding associated beneficiary partner responsible persons. The home page is fully operational and highly visible (the website counter shows over 36,000 visits), the project leaflets, newsletters and E-news have been published and distributed, notice boards printed in English and the three national languages and posted on the plots, the lists of media contacts in the three project countries obtained, and the activities within the refined action plan are in progress. Workshops for children, training courses for teachers, teaching materials and children's books have generated huge general public interest. Also, several internal workshops have been organized for specialists doing forest inventory, forest owners, users of forest reproductive material, tree dealers, seed dealers, silviculturists and forest managers in all project countries, in addition to workshops and scientific conferences for forest management, silviculture, forest genetic and legislative and governance events to promote forest genetic monitoring, forests and forestry to the target audiences and stakeholders at different levels, including the forest genetic monitoring dedicated session and the plenary keynote presentation at the IUFRO congress.

The project objectives and the work plan have been shown to be highly relevant, and the project as such as well as the concept of developing the system for forest genetic monitoring have already received great attention in the region and within the European forestry, nature conservation and other communities, e. g. the Institute for Digital Excellence in Slovenia.



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