

Project Report

“Ecological Data Gap Analysis and Ecological Sensitivity Map Development for the Bregalnica River Watershed”

Dekons-Ema and Macedonian Ecological Society

Book 1

Integral Report for the Project implementation

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The Integral Report for the implementation of the Project "Ecological Data Gap Analysis and Ecological Sensitivity Map Development for the Bregalnica River Watershed", Contract No., 0205-145/10 of 16.06.2014, signed between the Center for Development of the East Planning Region, represented by Dragica Zdraveva, coordinator of the Center and Environmental Management Associates Dekons-Ema represented by Menka Spirovska, Director. The project "Ecological Data Gap Analysis and Ecological Sensitivity Map Development for the Bregalnica River Watershed" is implemented within the Nature Conservation Programme in Macedonia, project of Swiss Agency for Development and Cooperation (SDC), coordinated by Helvetas Swiss Intercooperation and Farmahem.

CONTENTS

1	General information.....	5
1.1	Main goal	5
1.2	Geographic Range	5
2	Project Management	7
2.1	Coordination of Project Activities	7
2.2	Expert Team	8
3	Implemented Activities	10
3.1	Project Management	11
3.2	Organised meetings and workshops.....	11
3.3	Field Research	14
3.4	Database Management.....	18
3.5	New Principles, Innovative Approaches and Application of Good International Practices..	21
4	Cooperation with Other Organizations.....	22
4.1	Cooperation with the Other Project Activities from The Nature Conservation Programme and Other Project Activities in the Region.....	22
4.2	Cooperation with Other Civil Society Organizations and Stakeholders.....	24
4.3	Cooperation with the Agency for Spatial Planning	25
4.4	Cooperation with the Ministry of Environment and Physical Planning	25
4.5	Involvement and Cooperation with Students	26
4.6	Transversal Schemes in Implementation of the Actions	30
5	Main Outputs	33
5.1	Final Reports	33
5.2	Periodical Reports	34
6	Annexes.....	35
6.1	Annex 1. List of all participants in the project activity with contacts	35
6.2	Annex 2. Participants of the 2-week-long Field Work Organized by the Biology Students' Research Society on Plachkovica, 2014	38
6.3	Annex 3. Participants of the 2-week-long Field Work organized by the Biology Students' Research Society on Maleshevo (Klepalo), 2015	39

1 General information

1.1 Main goal

The main goal of the project activity was to analyze the ecological data gaps and to develop a map of ecological sensitivity for the Bregalnica river watershed. The main objectives were to analyze the current literature data, conduct field research in order to increase the amount of data regarding biodiversity as well as to propose a coherent network of protected areas and to develop a map of ecological sensitivity. All of these objectives will provide basis for protection and sustainable use of biodiversity in Bregalnica watershed. The elaboration of all of these documents and maps was coordinated with other projects and project activities in the Bregalnica river watershed. Furthermore, these documents will be used during the elaboration of the spatial plan of the East Planning Region.

1.2 Geographic Range

The biodiversity analysis was conducted in the Bregalnica River watershed. The largest part of this watershed belongs to the East Planning Region however, parts are also outside of the watershed. Thus, there is a defined **area of interest** which represents the union of the Bregalnica River watershed and the territory of the East Planning Region (Fig. 1).

The source of the Bregalnica River is under Chengino Kale at 1690 meters above sea level, which is also the easternmost point of the watershed. The southern border of the watershed runs along the Plachkovica Mountain, the source and the valley of the Kriva Lakavica River near the mine Buchim and Radovish. The western border runs along the lowest foothills of Konechka Mountain, until its mouth in Vardar and the western side of Ovche Pole i.e. the course and mouth of Svetinikolska River. The northern border of the watershed runs along the highest peaks of Osogovo Mountain, until the state border with the Republic of Bulgaria close to the peak Ruen. The border with Bulgaria is also the natural eastern border of the watershed.

The altitude range of the watershed moves between 143 m.a.s.l. at the mouth of Bregalnica River in Vardar River and 2202 m.a.s.l. at the peak Mal Ruen on Osogovo Mountain.

The Bregalnica watershed includes parts of the Osogovo Mountains, Maleshevo Mountains, Plachkovica Mountain, Konechka Mountain, Vlaina Mountain, Golak Mountain, Obozna Mountain, Bajaz Tepe Mountain, Gradishtanska Mountain, Mangovica Mountain, Ovche Pole Valley, Kochani Fields, Probishtip Valley and the valley of Lakavica River and Slan Dol. The border of this area covers the highest peaks of the abovementioned mountains:

Dzami Tepe (1801 m.a.s.l.) of the Maleshevo Mountain, Lisec (1754 m.a.s.l.) of Plachkovica Mountain, Kadiica (1932 m.a.s.l.) of Vlaina Mountain and the ridge of Osogovo Mountain with the peaks Carev Vrv (2084 m.a.s.l.) and Mal Ruen (2202 m.a.s.l.).

The Bregalnica River is the largest tributary of the Vardar River (225km long) and is the largest river in Eastern Macedonia. Some of the most important tributaries to Bregalnica River are: (from the right) Pehchevska River, Zhelevica River, Gabrovska River, Ochipalska River, Lukovichka River, Kamenica River, Orizarska River, Kochanska River, Zlatovska River and Svetinikolska River; (from the left) Ratevska River, Kamenica River, Budinarska River, Biglanska River, Zarovec River, Osojnica River, Gradeshka River, Zrnovska River, Plachkovica River, Kozjak River, Suva River, Otinje River and Kriva Lakavica River.

The area of interest (Fig. 1) has surface area of 4663.3 km² and includes the Bregalnica River watershed and the East Planning Region of Macedonia. The Bregalnica River watershed has the area of 4315.5 km² i.e. 16.78% of the territory of the Republic of Macedonia. The East Planning Region has a territory of 3548.7 km² or 13.8% of the territory of the Republic of Macedonia.

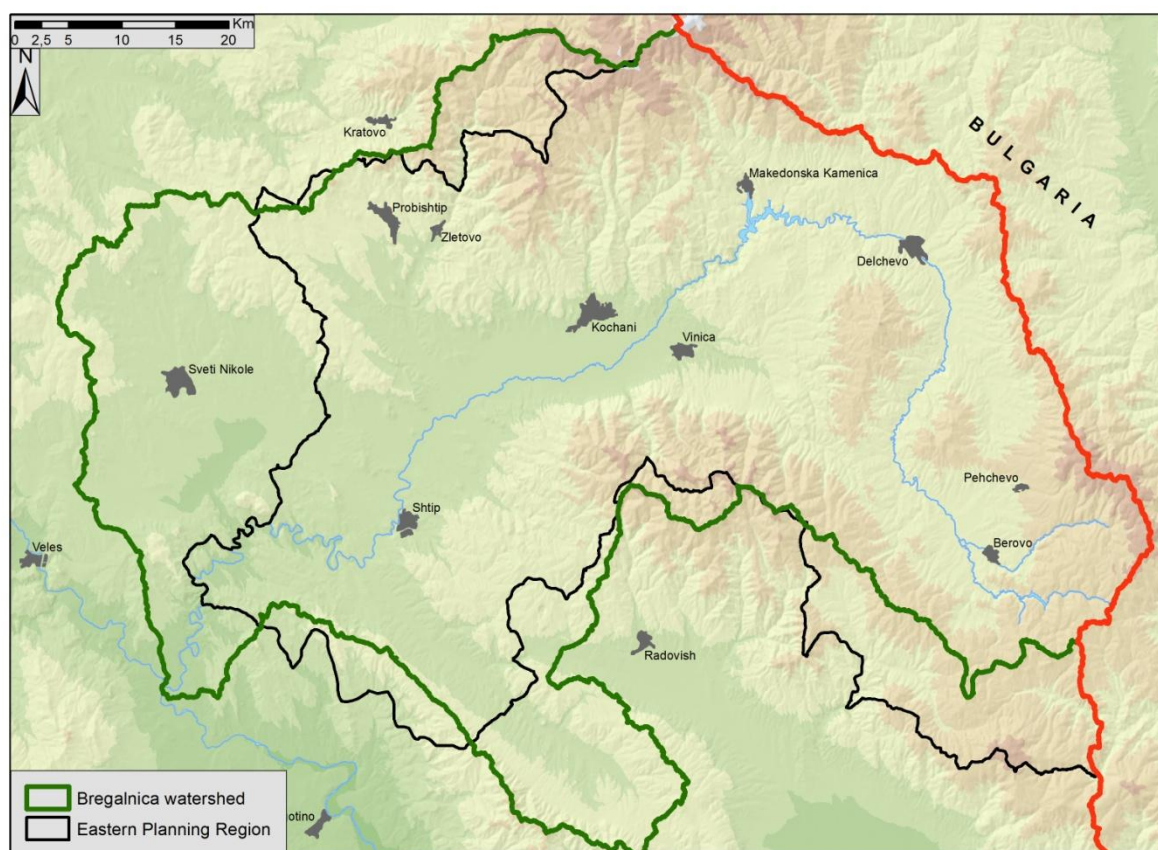


Figure 1 Geographic range of the Area of interest (Bregalnica watershed and East Planning Region)

2 Project Management

2.1 Coordination of Project Activities

The project activities were coordinated by Prof. Dr. Slavcho Hristovski, whose main task was to define and lead the program team, establish the research team, and research dynamics for the whole area. In order to ensure financially efficient and timely implementation of the project activities the leading team was established in the first phase of the project (Fig.2). Some of the main obligations of the leading team were to present the project results in front of the stakeholders, provide cooperation with the local stakeholders and decision makers and with other project programs and their offices.



Figure 2. Project Management Team

2.2 Expert Team

After the establishment of the leading team, the coordinator together with the four key experts defined the research team which was involved in the research of the fields of interest of the program activity (Fig.3).

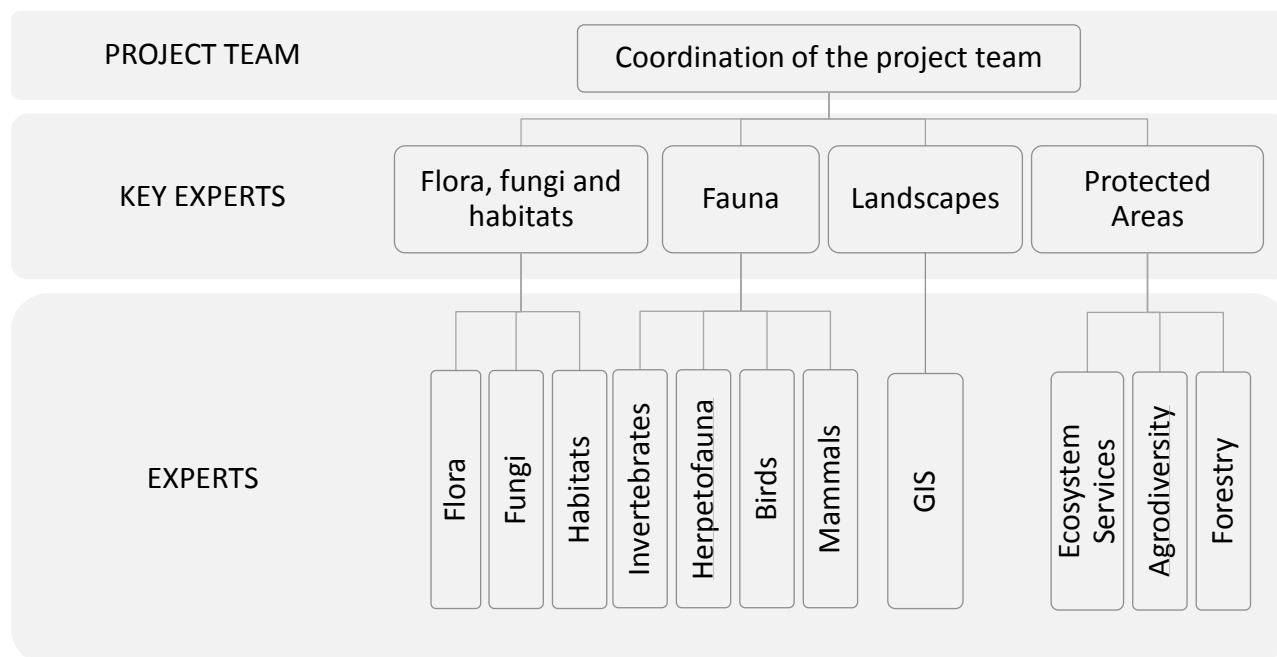


Figure 3. Research Team

Additionally, research teams for each group were formed and they contributed by collecting and analysing literature and field data. The research teams were first divided in seven groups but later were re-group as depicted in Table 1, in order to ease the communication and the organisation of the research.

The key experts were in charge of coordinating their groups and designing field research dynamics. In agreement with the key experts, the results from the field research were distributed to the project team and the coordinator integrated them into the Final Biodiversity Report for Bregalnica River watershed. In addition to the report, separate expert reports were provided.

Table 1. List of the researchers and their role in the team

Name and surname	Speciality/role in the team of experts
Vlado Matevski	Key expert for flora, fungi , habitats and expert for flora
Mitko Kostadinovski	Habitats
Katerina Rusevska	Fungi
Metodija Veleviski	Key expert for fauna and expert for birds
Dimche Melovski	Mammals research group coordinator and butterfly expert
Gjorgje Ivanov	Ungulates
Aleksandar Stojanov	Small mammals and bats
Danka Uzunova	Birds – assistant
Ana Arsovska	Birds – assistant
Ksenija Putilin	Birds – assistant
Liljana Tomovikj	Reptiles and amphibians research group coordinator
Bogoljub Sterijovski	reptiles and amphibians
Slavcho Hristovski	Ground beetles (Carabidae)
Despina Kitanova	Dragonflies and damselflies (Odonata)
Valentina Slavevska Stamenkovikj	Macro-invertebrates
Zlatko Levkov	Algae
Robertina Brajanovska	Key expert for protected areas and coordinator of the experts for ecosystem services, agrobiodiversity and forest diversity
Sonja Ivanovska	Agrobiodiversity group coordinator
Vladimir Dzabirski	Agrobiodiversity – livestock
Evgenija Jodanova	Agrobiodiversity – plants – assistant
Aleksandra Todorovska	Agrobiodiversity – livestock – assistant
Nikolcho Velkovski	Forest diversity group coordinator
Svetlana Pejovikj	Forest diversity – assistant
Natalija Melovska	Ecosystem services
Ivana Lozanovska	Ecosystem services and natural resources – assistant
Ljupcho Melovski	Key expert for landscape
Daniela Jovanovska	Landscape – assistant
Vasko Avukatov	Digital data processing, mapping and database management coordinator
Aleksandar Sarov	digital data processing, mapping and database management – assistant

3 Implemented Activities

The activities were conducted in the period from December 2014 to October 2015. They were mainly focused on field research which provided qualitative biodiversity data. The selection of priority species and habitats was of special interest for the research since it assisted in the identification of conservation priorities and their distribution in the region. The field activities included analysis of landscape diversity, collection of data for species of economic importance, and agrobiodiversity in the Bregalnica River watershed. The research was narrowed down to collection of material in the Bregalnica River watershed and its priority was the identification of important species in order to define the state of the protected areas and the proposed areas for protection in that region.

Digital processing of data and the development of criteria for the development of ecological sensitivity map for the research area were key parts of the project. The synchronisation of the database and the criteria for selection of important species were very important step as well. Data mapping was done in accordance with field research dynamics and the need of digital data analysis for certain research topics (landscapes, ecosystem services, protected areas, agrobiodiversity, biodiversity, etc.).

The management of project activities and the research team was in accordance with the plan and the cooperation agreement. The different research teams had joint field planning sessions which involved both the key experts and the management team. Occasional meetings among the research teams and the project manager were organised in order to synchronise field work and data processing. The key experts worked closely with their teams from March to October 2015 since this was the period of intense field work which gathered the missing data as identified in the first reports. All open questions and issues were discussed at several expert meetings. The goal of the first and third expert meeting was to synchronise the working groups and present the collected data in order to define next steps in the project. These meetings provided the forum for discussing criteria for data modelling required for the development of the ecological sensitivity map.

Cooperation with the organisations and institutions included in the “Programme for Nature Conservation in Macedonia” was maintained through joint meetings for reaching agreements and joint promotion of the results from different project activities, which were organised in the East Planning Region. It is important to note that the consultations between the Agency for Spatial Planning, MES and Dekons-Ema were organised in a timely and transparent fashion. In addition, the cooperation with Farmahem and through them with representatives from State Secretariat for Economic Affairs (SECO) project was of great importance. Moreover, it is important to highlight that there was also cooperation with the Ministry of Environment and Physical Planning (MOEPP). The research team also organized a field trip in the Bregalnica watershed for employees of MOEPP as an activity for strengthening of their nature protection capacities.

3.1 Project Management

The requirements of the research teams, such as the organisational and technical requirements, as well as field equipment, were coordinated by the project management team, which demonstrated effective distribution of tasks and responsibilities.

The division of the workforce into research teams for the field research proved to be a good tool for both organisational and research purposes. Through the synchronisation of the research methodology and dynamics, joint cooperation was promoted during field research. Again, for the purposes of information exchange between all members of the management and research teams and synchronisation of the field research methodology, several work meetings (in smaller and larger groups) were organised in the final phase of the project.

3.2 Organised meetings and workshops

The first expert meeting for coordination of the activities was organised in hotel “Shagal” – Vinica (3rd-6th- September 2014). This meeting was used for defining concrete responsibilities for the experts, timetable and geographical scope of the project, work dynamics and the communication with the experts were defined. In addition, the technical and practical aspects of the field and research tasks were explained to the experts. The methodology for development of the ecological sensitivity map and the gaps in the data which are crucial for its creation were discussed. The experts provided constructive criticism which improved the methodology for the ecological sensitivity map. Also, in this meeting an inspection of the research area was conducted, in which ecosystems and habitats for research were identified. The meeting was of great importance since it provided key directions and dynamics for the future research.

The second expert meeting was organised on the 28th November 2015 in the offices of the Museum of Natural History of Macedonia (Fig. 4), in which all relevant parties participated. The expert and project management team, representatives from the MOEPP, the Swiss Agency for Development and Cooperation, Farmahem, SECO, Centre for East Planning Region, the NGO OHO and others participated in this meeting.



Figure 4. Second experts meeting (Museum of Natural History of Macedonia), held on 28.11.2014

Further meetings were organised between the research teams of junior experts and volunteers, who were included in the analysis and field activities which were predefined in the project. Because of the extensive research area and the large data sets, the aim of the management team was to include a larger group of researchers in order to be able to have good coverage over the research area, generate good data and process the data in due time to complete the objectives of the project.

A third expert meeting (Fig. 5) was held on 30th January 2015 in the restaurant Orhidea in Skopje, and its aim was to introduce the experts to the methodology for creation of a sensitivity map, as well as to jointly define the criteria for selection of the important species to be modelled for the creation of the sensitivity map and for the presentation of key and/or specific habitats. In addition, in order to harmonise the field methodology for data collection, the experts were trained for several mapping and database projects on tablets.



Figure 5. Third expert meeting (restaurant Orhidea, Skopje, 30.01.2015)

The fourth expert meeting was organized in order to present the progress of field research activities and the collected data (Fig. 6). It was held in villa Klepalo, Berovo from the 23rd-25th June. In addition, one day visit to Vlaina Planina and Kukuljeto were organised. Along with the management team and part of the research team, representatives from Farmahem, Swiss Foundation Helvetas and Centre for Development of the East Planning Region participated in the meeting. The experts stressed the need for further field research activities following the presentation of the previously collected data, in order to form a clearer picture for the state of the biodiversity in the region. The data was also required for synchronisation of the results of the Sector Studies for the spatial plan of the East Planning Region, conducted by the Agency for Spatial Planning (planned to be finalised by October 2015).



Figure 6. Fourth expert meeting (villa Klepalo, Berovo, 23-25.06.2015)

In October 2015, the fifth and last expert meeting was held as a part of the project (Fig. 7). The aims of the final meeting were to inspect the collected data from the research of biological and agrobiological diversity in the Bregalnica Riverwatershed, to analyse how this data overlaps or changes the status of the existent and proposed protected areas, and to present the proposed system of protected areas in the watershed. The management team, key experts and representatives from Farmahem, Agency for Spatial Planning, MOEPP, and the Centre for Development of the East Planning Region reviewed the specifics of the area and jointly debated their status.



Figure 7. Fifth experts meeting (hotel Queens, Skopje, 16.10.2015)

3.3 Field Research

The biodiversity research in the Bregalnica River watershed begun in July 2014 in cooperation with the Biology Students' Research Society. Through this student research activity a lot of data for Plachkovica Mountain was collected. The last field research was conducted in October 2015. During the 16 month research period there were 515 days of field research - 195 days in 2014 and 305 days in 2015.

The scope of the research consists of steep-like landscapes in Ovche Pole, rice fields in Kochansko Pole, dense mixed forests in Plachkovica and Maleshevski Mountains, and all water habitats – from river Bregalnica's tributaries, through accumulations and dams, to the lower meanders of river Bregalnica.



Figure 8. Part of the research team (photos from Zrnovci and Shtip region, forest in the gorge of Pehchevska River)

In 2014, in the autumn period, intensive research was conducted by the mammal, bird and fungi teams (Fig. 8). The experts for habitats and landscapes also conducted field research which lasted for several days. Part of the field research activities are presented below:

- From 7th – 22nd July 2014, in cooperation with the Biology Students' Research Society, a 15-day field research activity was conducted at the Plachkovica Mountain. During the field activities, several localities were researched which belong to the Bregalnica watershed: Lisec, Lumija River valley, Turtel and others. Over 40 participants were included in the research, 35 students and 7 experts from the project team. During the research a lot of biodiversity data was collected from Plachkovica Mountain.
- In the months of July, August and September 2014, collection of entomological material has been collected with “barber” traps in Shtipsko Pole. The main focus was given to the halophilic associations and hilly pastures,

- At the same time field research was conducted in several localities in Bregalnica's watershed (Shtipsko Pole, valley of Kriva Lakavica River, Zrnovska River in Plachkovica, Golak, Maleshevski Mountains, Obozna and Bejaz Tepe, Pijanec and Vlaina). Here, 17 experts from the project team have participated In these activities (Fig. 9);
- In addition, the research teams of mammals, birds and fungi have conducted field research from the 18th – 19th September 2014 in the vicinity of Berovsko Ezero and an addition field research activity from 25th – 26th September 2014 in the localities: Bogoslovec, Lakavica River and Mantovo accumulation (Fig. 9);
- On October 2014, mammal team visited the locality in order to identify species on several occasions;
- Joint field research activities were conducted by the fungi and birds teams, from the 21st – 29th October 2014,
- From 22nd to 26th October 2014 a field research activity lasting several days was conducted by the flora, habitats, landscapes and invertebrate experts.



Figure 9. Part of the research equipment and findings of the teams

Biodiversity research continued with intensive field research in 2015. In this period (from January to October 2015) the research teams (biological and landscape diversity, agrobiodiversity, forest ecosystems, ecosystem services and use of biological resources) defined their work methodology, corresponding field equipment and established dynamics for field research (Fig. 10).



Figure 10. Part of the findings of the field research (photos above – 01.04.2015 Slan Dol and v. Ularci); photos bellow – 29.03.2015 in v. Penush and 05.12.2015 v. Neokazi)

In accordance with the weather conditions in the second phase of the realisation of the project and the field research, the most intense research was realised in the months July 2014 (95 field activities) and July 2015 (85 field work activities). The most active research months were in the period between March and August, which corresponds with the vegetation zone and the increased activity of the animals, in addition to the good weather conditions. In this period, the most active field research was conducted in the groups of insects, reptiles and birds. The schedule of the field research in groups during the whole period of realisation of the project are shown in Chart 1.

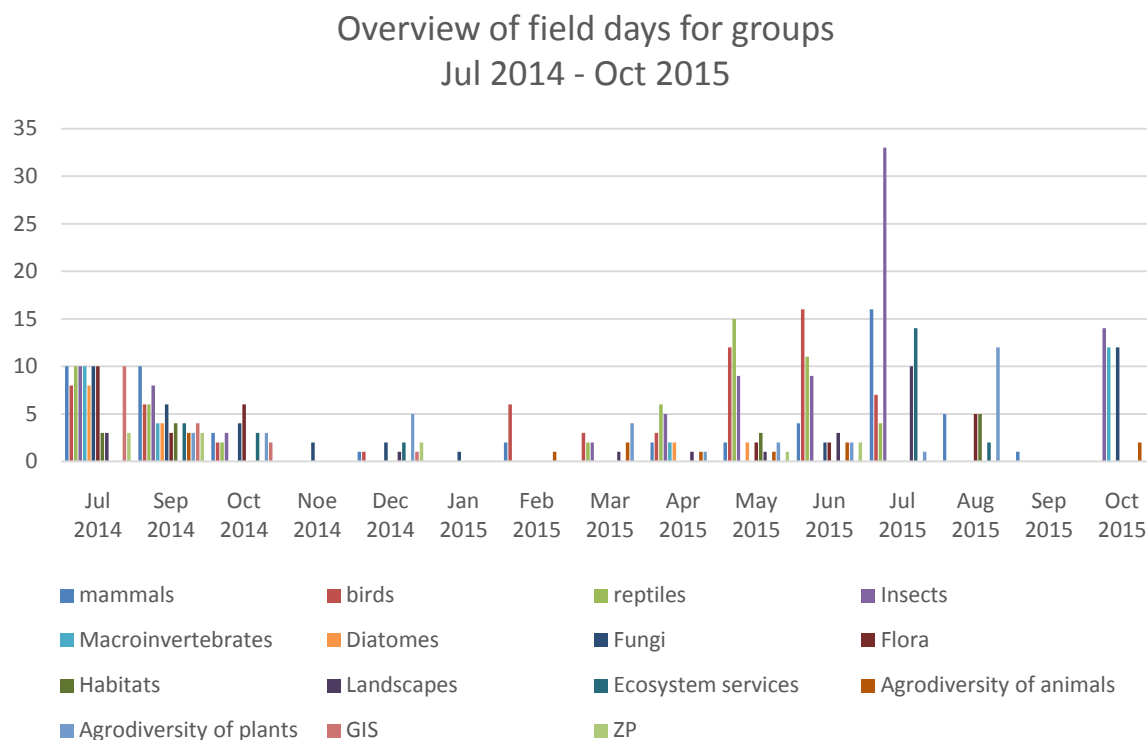


Chart 1 Overview of the field research in the period July 2014 – October 2015

3.4 Database Management

Tablets were used to synchronise the methodological approach of data collection from the field research activities. An adequate software for GPS navigation (Orux maps), database (MEMENTO) and GIS were installed in the tablets, which were tested during the field activities in the first few months from the beginning of the project (Fig. 12). The research teams and the key experts had received training for efficient use of the tablets. As data was accumulated, the GPS data from the field work (tracks of movement and marked locations) was converted in GIS format. The accumulated data from the MEMENTO database had accumulated into a map of species distribution (Fig. 13).

The preparation process, which included the creation and personalisation of the databases intended for biodiversity research, as well as the training for the use of the databases of all research teams, was completed during January 2015. In the same period an overview map of the researched area was created, along with topographic maps in scale of 1:100000 as a basis, which contains the borders of Bregalnica's watershed and the East Planning Region, as well as overview of the protected and the proposed for protection areas according to the Spatial Plan of the Republic of Macedonia or the newly identified and proposed areas for protection in agreement with the Representative network of protected areas. In addition, a lot of work was done to change the structure of 13 databases in accordance with the requirements of all research groups.

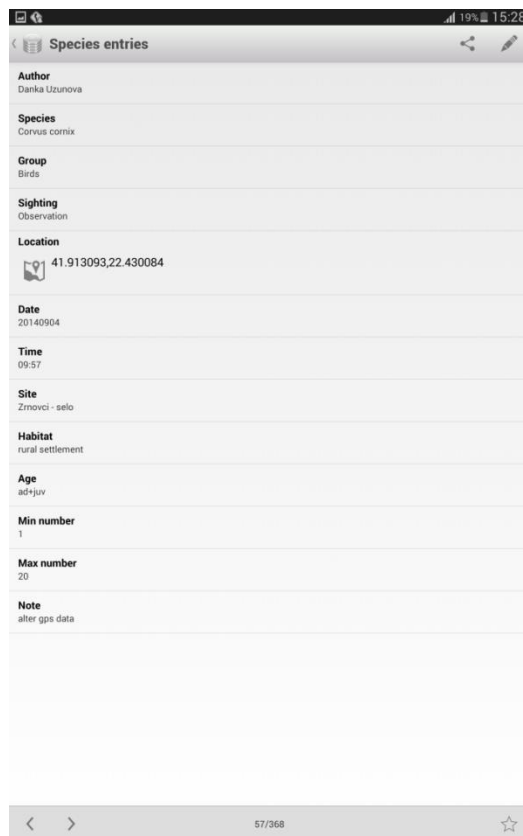


Figure 11 Interface of the database (MEMENTO) – part for data input, installed on a field research tablet

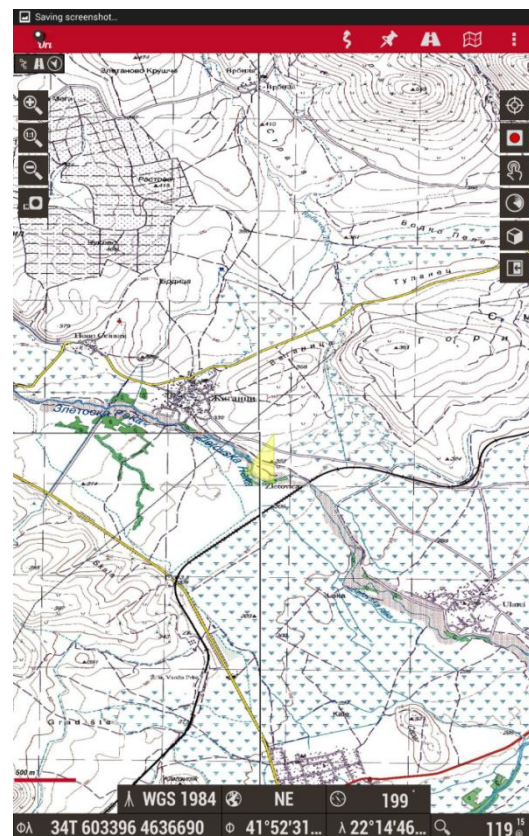


Figure12 Interface of the software OruxMaps, installed on field research tablet

Until October 2015, 4000 entries were added to MEMENTO databases, which were used by the research groups (Fig. 11). The experts often recorded information relevant for other research groups in their databases. The total number of entries for biodiversity, landscape diversity and agrobiodiversity is 20 000 records.

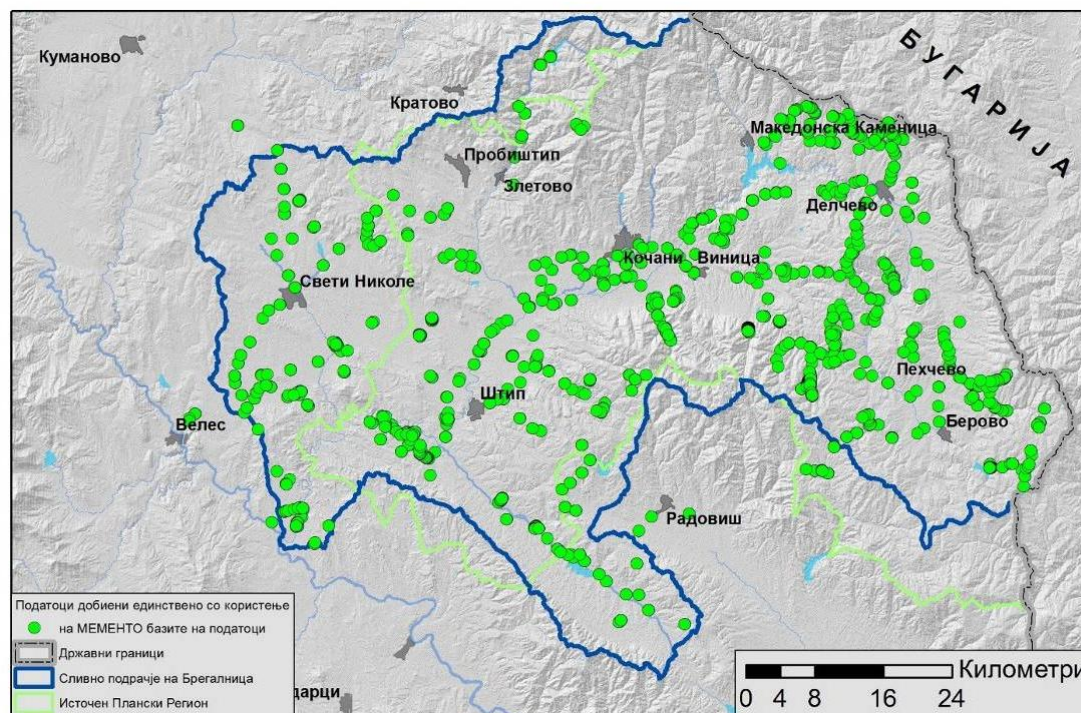


Figure 13. Using data from MEMENTO database in the research in Bregalnica River watershed.

Significant differences were visible in the use intensity of MEMENTO databases, which is a result of different requirements and specificities of field work conducted by different expert groups. Namely, one of the major advantages of using GPS during field research is the opportunity to obtain precise data location and decrease the time required to record data. Part of the research groups had either very little data to record, or a small number of locations for the data of interest, and as a result the advantages for using the methodology were lost. On the other hand, part of the research groups did not have the opportunity to record data of interest (identification of microscopic species and other) during field work, but the collected material from specific locations was identified in a laboratory.

Besides the use of the databases from all research groups, it is evident that for some types of research more adequate methods exist. Consequently, differences among the research groups were evident. Groups that worked with biodiversity which can be identified on site (mammals, invertebrates, flora, herpetofauna, birds, etc.) had databases with 120-880 records, while the remaining groups (habitats, landscape ecology, algology, macro invertebrates, agrobiodiversity, etc.) had a significantly lower number of records (16-80).

Significant habitats were mapped in detail, while remaining habitats and associations were marked as single spotted locations, which when needed were used in the mapping process. New thematic maps for biological, landscape, forest and agrobiological diversity have been created and used for the development of the ecological sensitivity map and the Report on the Status of Protected Areas of the East Planning Region. The created maps

include: soil map of the research area, geological base maps, capacity maps, balance and demand-supply of ecosystem services, habitat CORINE map, protected and proposed for protection areas maps, maps of internationally important areas.

3.5 New Principles, Innovative Approaches and Application of Good International Practices

The creation of the ecological sensitivity map of the Bregalnica River watershed was the main activity of the project. The experts of this project used and developed for the first time adaptations of the state-of-the-art methodology for development of ecological sensitivity map. The adaptations were made because:

- The specificity of the region of the research area (which is a combination of watershed and administrative area and it is called area of interest) and
- For overcoming the problem of unequal distribution of data and knowledge for biodiversity in the area of interest.

The parameters used with this methodology are: structure (specific aspects of the position of the terrain of the area of interest), composition (contain data for biodiversity), and abiotic risks.

More details for the creation of the ecological sensitivity map, the used methodology and parameters are provided in the report Ecological Sensitivity Map with interpretations.

Additionally, the assessment of the importance of the landscapes and corridors for the habitat connectivity is one more methodology which is used for the first time for analysis of the landscape diversity data in Macedonia.

The use of MEMENTO as base for standardised data collection is another innovation which was included in the realisation of the activities of this project.

4 Cooperation with Other Organizations

During the implementation of this project activity, there was a continuous cooperation with all other project activities within The Nature Conservation Project in Macedonia. The managing team considered maintaining and strengthening the cooperation not only with this Project, but also with all key stakeholders active in the entire Bregalnica River watershed. Exchange of information for better implementation of the different projects was of particular importance when defining the condition with the natural values in the region. Thus, the coordinating team had continuous consultation with all stakeholders, especially with the Agency for Spatial Planning and the Development Center for the East Planning Region.

Very important aspect for this project activity, as well as for the project activity for management of Bregalnica River watershed which is led by SECO, was the close cooperation and exchange of information between the teams working in the region – especially for the data for Bregalnica River watershed important for defining the map of the ecological sensitivity. Thus, the managing team in cooperation with Farmahem and Center for the Development of the East Planning Region (CDEPR) was regularly delivering data from and to the national institutions, local authorities and organizations that worked in the region. The borders of the researched area along the Bregalnica River watershed were adjusted with the borders used during the research for the project activity financed by SECO, in order to have better coordinated data management for the CDEPR as final user.

In this direction, very good cooperation was established with MOEPP in terms of providing data for the Bregalnica River watershed important for defining the system of future protected areas in the watershed.

Moreover, aiming for coordination and cooperation between all project activities, a mutual Agreement was achieved that this project activity will deliver all its findings for the biological and landscape diversity and proposed areas which will be identified as important for protection, to the MOEPP and the Agency for Spatial Planning before the sectoral studies necessary for the creation of the Spatial Plan for the East Planning Region are finalized.

4.1 Cooperation with the Other Project Activities from The Nature Conservation Programme and Other Project Activities in the Region

The Managing Team had constant cooperation with and coordinated the actions of this project activity with all other project activities within The Nature Conservation Project in Macedonia which is supported by the Swiss Agency for Development and Cooperation (SDC).

All actions and results were transparently presented in front of all organizations and institutions involved in the project: Farmahem DOOEL Skopje, Centre for Development of the East Planning Region, Foundation OHO, SECO, PURS – Management of Bregalnica River watershed and IDEAO.K (Study for the Status of the Potential for Tourism Development in the East Planning Region).

This project activity has contributed in defining the Study and the Strategy for Tourism Development in the East Planning Region, by giving directions and data for including natural values and resources as potential for future tourism development in this region. IDEAO.K and CDEPR organized 3 working meetings for development of the Strategy for Tourism Development in the East Planning Region and Action Plan (held on 31.10.2014, 05.06.2015 accordingly and final event on 15.10.2015 in Shtip). Besides the Managing Team of this and other project activities, many local authorities, private business owners, regional governmental agencies and NGOs attended the meetings with the main aim to jointly develop this strategic document.

Additionally, the CDEPR presented the Development Project for the East Planning Region (2015 – 2019) on 21.11.2014 and part of the planned actions were considered when defining the future proposed protected areas in the area of the watershed and/or the potential threats towards them.

SECO with the project activity „PURS – Management of Bregalnica River watershed” have organized several public presentations and workshops for implementation of their project activity (public presentation of the project activity in December 2014 and final presentation in November 2015). The direct connection and possibility for mutual cooperation between these two project activities was established during the workshop organized by the Group for National Politics Dialogue on the topic “Requirements for Improvement of the Capacities for Water Management” held in December 2015. This resulted with direct cooperation through exchange of GIS data between SECO and the Management Team.

The Management Team established cooperation with Farmahem in the scope planning phase of the project activity. Farmahem directly followed the progress of this project activity as they are a national coordinators for The Nature Conservation Project in Macedonia (Figure 14). Moreover, in September 2015, the Macedonian Ecological Society continued its direct involvement through the awarded small grant “Trail of the Woodpecker”. The project is planned to be implemented until the end of the first half of 2016 and represents a direct conservation action (establishing an educational trail, which will be set near Ponikva, Osogovo Mts).



Figure 14. Representatives from Farmahem, CDEPR and Helvetas attending the fourth expert meeting

Foundation OHO has its own project activity within The Nature Conservation Project in Macedonia, which is related to educational actions in the area of Bregalnica River watershed. Upon request from the Foundation, MES established cooperation in February 2015, by providing help in defining the most important tree and bird species found in the area of Bregalnica River watershed. MES provided comments regarding the scientific aspects of the educational package prepared and delivered by foundation OHO, and reviewed the final version of the package.

4.2 Cooperation with Other Civil Society Organizations and Stakeholders

During the implementation of the project activity, Dekons-Ema continued its cooperation with other civil society organizations. MES was a part of the management and research team, providing its experts and technical capacities for implementation of the project activity. MES has great experience in planning and organizing complex field research in the region and provided technical and expert support for implementation of the project activity. MES with its experience of work on the long-term project for protection of Osogovo Mts. and projects for research of Ovche pole and Lower Bregalnica, as well as the data from some independent research in the area of Bregalnica River watershed, provided valuable help and were used in defining the natural values in Bregalnica River watershed and EPR.

During the entire period of cooperation, MES engaged senior experts and assistants for realization of the field research as a way to strengthen its own expert capacities. Additionally, MES provided access to cartography information and databases for biodiversity

in the area of Bregalnica River watershed. The expert and technical aspect of the implementation of this project activity together with MES, was conducted with many consultative meetings (7 meetings in 2014 – when defining the methodology and the specific activities and only 2 meetings in 2015).

Through direct cooperation with the local authorities from the East Planning Region (thereby also in the area of the watershed), the Managing Team have presented the results and the findings from the field research during the meeting of the Council of mayor from the EPR held in July 2015. The conclusion of this meeting was that local authorities consider the economic development of the region as a priority, and that the primary concept for protected areas sounds counterproductive. The lack of consciousness is one of the next challenges for the area of the watershed and EPR where the outputs (Report on the Status of Protected Areas and Map of Ecological Sensitivity) from this project activity can be applied when working with the stakeholders from the local authorities during the establishment of protected areas in Bregalnica River watershed, for effective conservation of the biodiversity.

4.3 Cooperation with the Agency for Spatial Planning

In the period between August and October 2015, the Managing Team had intense cooperation with the Agency for Spatial Planning, in order to consolidate the activities and the results that are of mutual interest. In that period, the Agency was in a final phase of the preparation of the separate studies for the Spatial Plan for East Planning Region. Results from the valorisation of the biological, landscape, forest and agriculture diversity are overlapping with this spatial plan. In order to adjust the findings, it was agreed to support the production of the Map of ecological Sensitivity and the Report on the Status of Protected Areas in EPR, and integrate them in the Spatial Plan of EPR. With this we achieved one of the most important goals of this project activity, direct incorporation of the results from the biodiversity study into a regional strategic document.

4.4 Cooperation with the Ministry of Environment and Physical Planning

The Managing team and the Ministry of Environment and Physical Planning organized 2 meetings between Farmahem, Agency of Spatial Planning and Development Centre for East Planning Region (held on 12.03.2015 and 20.03.2015 accordingly, in Skopje). During the first meeting, it was agreed that this project activity will contribute in the elaboration of the Report on the Status of Protected Areas in EPR (document to be used during the elaboration of the Spatial Plan for EPR by the Agency of Spatial Planning). On the second meeting, with the Department of Nature in MOEPP, it was suggested to create a Steering Committee consisted of representatives from the municipalities from EPR, and to

communicate with and inform the local authorities. Additionally, it was agreed to incorporate also information for the geological sites and characteristics from the final study of this project activity, and to share them with Macedonian Info Centre.

There was a direct cooperation with the MOEPP (precisely, with the Department of Nature) through sharing information from the field research along the Bregalnica River watershed, as well as their active participation in the research. Experts, together with the MOEPP, conducted joint visits to the important sites at the beginning of June 2015. The following sites were visited: Gladno Pole – important steppe locality with several new species found; Slan Dol near v. Penush, where there are well preserved willow-poplar riparian forests, steppe habitats, saline wetlands and springs; gorge of river Zletovska, Beaz Tepe and Kartal where there are natural pine associations in a beach forest.

After the last experts meeting within this project activity, another meeting with the Department of Nature was held in order to review all protected areas (existing, proposed and newly identified ones), as well as to set up priorities and directions for starting processes of designation of protected areas in future.

4.5 Involvement and Cooperation with Students

One of the goals of the project activity and a working task for the Project Team were cooperation with student organizations and involvement of students in the field research.

In the period 07-22.07.2014, a 15-days summer research camp was organized on Plachkovica Mt. in cooperation with Biology Students' Research Society (Figure 15). During the field activities, following localities belonging to Bregalnica River watershed were visited: Lisec, valley of river Lomija, Turtel. More than 30 participants were involved in the research, of which majority were students and 7 experts from the Project Team (S. Hristovski, Lj. Melovski, Lj. Tomovich, B. Sterijovski, K. Rusevska, N. Melovska, D. Jovanovska and Z. Levkov - Annex 2). During the research, many data on the biodiversity of Plachkovica Mt. were collected. Afterwards, when research ended, the data were processed and analyzed by the students with the help of the experts. Their results were used for biodiversity assessment in the Bregalnica River watershed.



Figure 15. Working with students from Biology Students Research Society on Plachkovica Mt.

The cooperation with the Biology Students Research Society continued in 2015 by organizing several one-day field trips (Pehchevska River and Slan Dol) and one two-week research camp at Klepalo, Berovo region. During the research camp, following localities were visited: Klepalo, Ramni Rid, Chaushica, Aramiski Rid, Divna, Lake Berovo, Murite, Kjeramizhdjen, Ambarite, Chengino kale, Gola Chuka, Dabevski potok, Klepalska River, Breza and Karaulnik, which over wide scope of habitats and species (Figure 16 and 17).



Figure 16. Specific habitats in the area of Bregalnica river watershed (fir forests at Murite, sand extractions near v. Kjoseleri, erosive forms – Slan Dol, bog with Round-leaved Sundew – Chengino Kale)



Figure 17. Specific species in the area of Bregalnica River watershed (*Suncus etruscus* at Blatishte, larvae from the butterfly *Cerura vinula*, a herd of cows on Chengino Kale and Round-leaved Sundew)

36 participants were included in the research, of which 17 were students, 6 were secondary school students and 10 national and international experts (Lj. Melovski, D. Melovski, N. Melovska, D. Jovanovska, I. Lozanovska, D. Kitanova, D. Uzunova, M. Veleviski, Lj. Tomovich, I. Dedov (Annex 3). The students and the secondary school students participated in all field research, processed and analyzed all collected material under the supervision of the experts (Figure 18). Many other students and postgraduates were also included in the investigation of various fields: entomology, ornithology, mammology, agrobiodiversity, identification of forests with high natural value etc.



Figure 18. Working with students from Biology Students Research Society at Klepalo

Also, these data were included in the valorisation of the biological, landscape, agro-biological and forest diversity in the area of Bregalnica River watershed.

4.6 Transversal Schemes in Implementation of the Actions

In the implementation of this project activity, various profiles of participants were directly involved: from experts to volunteers, who were involved in realization of specific tasks. A total of 85 participants were involved, which, according to the different gender and the role in the project activity, are divided on the following way presented in photos 19 and 20.

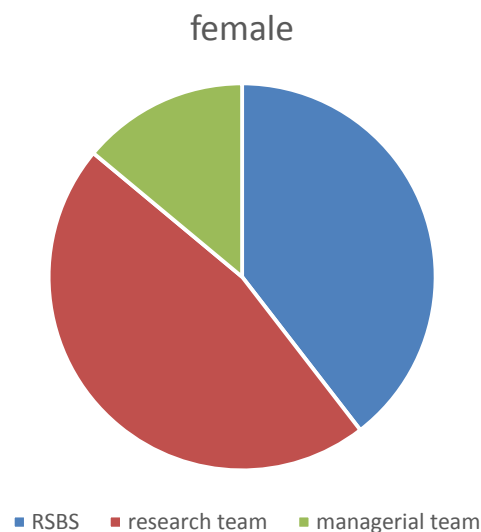


Figure 19. Overview of the female participants from different groups in implementation of the project activity

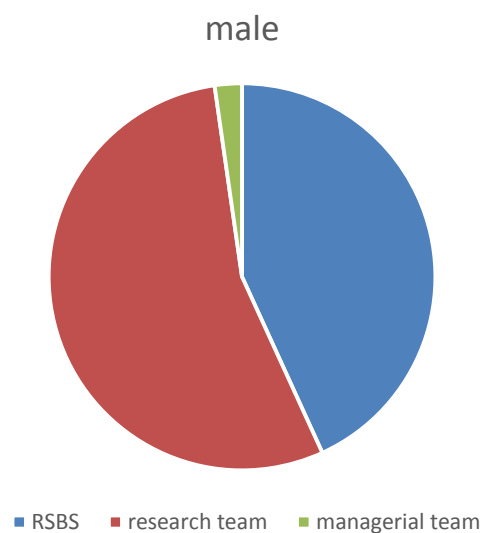


Figure 20. Overview of the male participants from different groups in implementation of the project activity

Data showed that, according to the different groups in implementation of the project activity (BSRS, investigating team and managing team), female gender is dominant in the managing team (14%) – and 2% males are managers. In the investigating team, males are dominant (53 %), while the females are 47%.

More detail overview of the male-female ratio according to the level of expertise in the implementation of the project activity, are presented below (Figure 21 and 22).

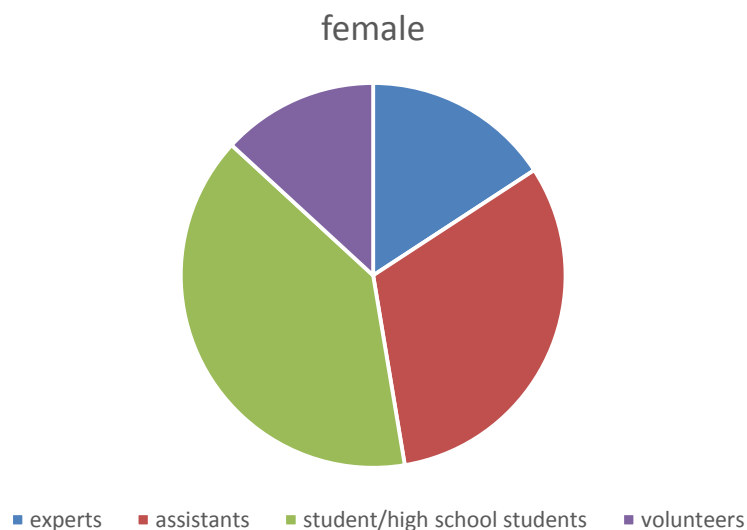


Figure 21. Overview of female participants in the implementation of the project activity according to the expertise

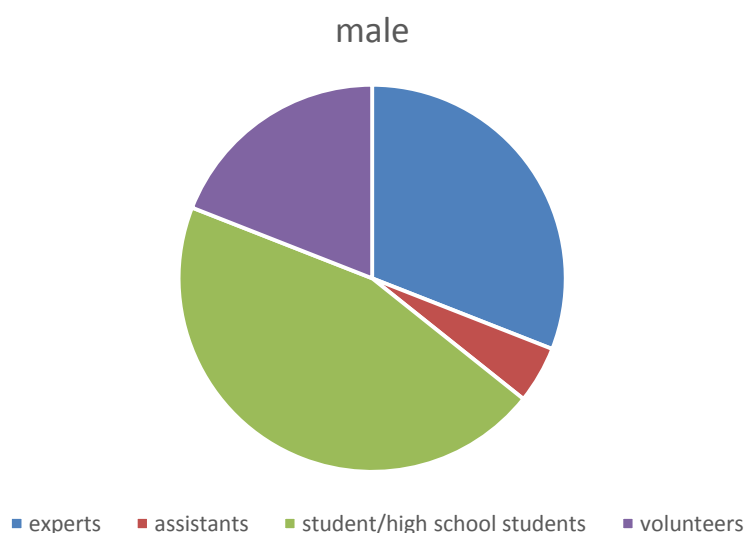


Figure 22. Overview of male participants in the implementation of the project activity according to the expertise

Regarding the expertise, most of the experts in the implementation of this project activities were male (31%), while 16 % were female. The female participants were more often assistants of experts (up to 32%), compared with males with 5 %. Male participants are also dominant among the students/secondary school students (45%), compared to 39 % female.

5 Main Outputs

Numerous documents were produced as a result of the analysis of the collected data for the biological, forest, landscape diversity and agrobiodiversity. A list of all these documents is presented in the text below.

5.1 Final Reports

1.1 Biodiversity of Bregalnica River watershed

- 1.1.1 Final experts report #1 – Habitats in Bregalnica River Watershed
- 1.1.2 Final experts report #2 – Plant diversity in Bregalnica River Watershed
- 1.1.3 Final experts report #3 – Fungi in Bregalnica River Watershed
- 1.1.4 Final experts report #4 – Diatom flora in Bregalnica River Watershed
- 1.1.5 Final experts report #5 – Macroinvertebrate fauna in Bregalnica River Watershed
- 1.1.6 Final experts report #6 – Dragonflies in Bregalnica River Watershed
- 1.1.7 Final experts report #7 – Ground beetle diversity (Coleoptera, Carabidae) in Bregalnica River Watershed
- 1.1.8 Final experts report #8 – Daily butterflies (Lepidoptera, Papilionoidea) in Bregalnica River Watershed
- 1.1.9 Final experts report #9 – Batrachofauna and herpetofauna in Bregalnica River Watershed
- 1.1.10 Final experts report #10 – Birds in Bregalnica River Watershed
- 1.1.11 Final experts report #11 – Mammals in Bregalnica River Watershed
- 1.1.12 Final experts report #12 – Plant agrobiodiversity in Bregalnica River Watershed
- 1.1.13 Final experts report #13 – Biological diversity in domestic animals in Bregalnica River Watershed
- 1.1.14 Final experts report #14 – Forests in Bregalnica River Watershed
- 1.1.15 Final experts report #15 – Ecosystem services in Bregalnica River Watershed

1.2 Landscape diversity in Bregalnica River Watershed

- 1.3 Report on the status of Protected Areas in Bregalnica watershed
- 1.4 Map of Ecological Sensitivity

5.2 Periodical Reports

- 1.1. First and second experts report #1 for GIS and data bases
- 1.2. First and second experts report #2 for habitats
- 1.3. First and second experts report #3 for vascular plants
- 1.4. First and second experts report #4 for fungi
- 1.5. First and second experts report #5 for mammals (Mammalia)
- 1.6. First and second experts report #6 for birds (Aves)
- 1.7. First and second experts report #7 for amphibians and reptiles (Amphibia and Reptilia)
- 1.8. First and second experts report #8 for dragonflies (Odonata)
- 1.9. First and second experts report #9 for ground beetles (Coleoptera, Carabidae)
- 1.10. First and second experts report #11 for daily butterflies (Rhopalocera, Lepidoptera)
- 1.11. First and second experts report #11 for biodiversity in water ecosystems
- 1.12. First and second experts report #12a for agrobiodiversity – plants
- 1.13. First and second experts report #126 for agrobiodiversity – animals
- 1.14. First and second experts report #13 for forests
- 1.15. First and second experts report #14 for landscape diversity
- 1.16. First and second experts report #15 for ecosystem services and use of natural resources
- 1.17. First and second experts report #16 for protected areas

6 Annexes

6.1 Annex 1. List of all participants in the project activity with contacts

List of contacts from all persons involved in the project activity: Approach and methodology for analysis of the gaps in the ecological data and preparation of a map of ecological sensitivity for the area of Bregalnica River watershed

	Name and surname	Role in the project activity	E-mail	Contact phone
Managing team	Menka Spirovska	Coordination of the Project activity	m.spirovska@ema.com.mk	078 252 676
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	Danka uzuova	Technical aspects of project activities (part of the investigating team for birds)	uzunova@mes.org.mk	070 908 131
Investigating team	Vlado Matevski	Key expert for flora, fungi , habitats and expert for flora	vladom@pmf.ukim.mk	070 398 085
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	Katerina Rusevska	Fungi	krusevska@pmf.ukim.mk	070 423 684
	Metodija Veleviski	Key expert for fauna and expert for birds	velevski@mes.org.mk	070 782 826
	Dimche Melovski	Coordinator of the mammalian research group and expert for butterflies	melovskid@mes.org.mk	078 393 436

Integral Report for the Project implementation

	Name and surname	Role in the project activity	E-mail	Contact phone
	Gjorgje Ivanov	Ungulates	ivanov@mes.org.mk	078 349 111
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	Liljana Tomovikj	Coordinator of the reptiles and amphibian research group	lili@bio.bg.ac.rs	00381638672058
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	Aleksandra Todorovska	agrobiodiversity– livestock – assistant	todorovska@mes.org.mk	071 605 645
	Nikolcho Velkovski	Coordinator of the forest diversity group	nikolcovelkovski@gmail.com	072 228 819

	Name and surname	Role in the project activity	E-mail	Contact phone
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	Daniela Jovanovska	Landscape – assistant	jovanovska@mes.org.mk	078 370 705
	Vasko Avukatov	Coordinator for the group for digital data processing, mapping and database management	avukatov@mes.org.mk	070 434 280
	Aleksandar Sarov	digital data processing, mapping and database management – assistant	sarov@mes.org.mk	077 857 411

6.2 Annex 2. Participants of the 2-week-long Field Work Organized by the Biology Students' Research Society on Plachkovica, 2014

1. Zlatko Levkov
2. Ljilana Tomovic
3. Aleksandar Pavlov
4. Elena Jovanovska
5. Magdalena Petkova
6. Ljupco Melovski
7. Natalija Angelova
8. Daniela Jovanovska
9. Maja Mladenova
10. Elena Minova
11. Martin Trpevski
12. Katerina Misirkova
13. Lozenka Ivanova
14. Mitko Karadelev
15. Katerina Rusevska
16. Aneta Lambevaska
17. Nenad Petrovski
18. Todor Tokov
19. Marjan Komenov
20. Ana Marija Atanasovska
21. Slavco Hristovski
22. Dime Melovski
23. Emilija Bozinovska
24. Kiril Arsovski
25. Georgi Hristov, Bugarska akademija na naukite
26. Sandra Mateska
27. Bogoljub Sterijoski
28. Danka Uzunova
29. Bisera Vlahova
30. Oliver Paunovski
31. Vasko Avukatov
32. Aleksandar Stojanov
33. Andrej Gonev
34. Trajce Mitev

6.3 Annex 3. Participants of the 2-week-long Field Work organized by the Biology Students' Research Society on Maleshevo (Klepalo), 2015

1. Kiril Arsovski
2. Magdalena Petkova
3. Maja Mladenova
4. Elena Minova
5. Martina Markovska
6. Pane Kamcev
7. Vesna Trpcevska
8. Oliver Paunovski
9. Monika
10. Filip Kiselovski
11. Nenad Petrovski
12. Aleksej Anovski
13. Vanko Gjorgjiev
14. Bisera Vlahova
15. Andrej Gonev
16. Gala Matevska
17. Sandra Matevska
18. Angela Klimovska
19. Marija Pitoseska
20. Slave Nakev
21. Dejan Rajkovski
22. Stefani Ordevska
23. Ljupco Milenkovski
24. Ivajlo Dedov
25. Dragan Cobanov
26. Slavco Hristovski
27. Ljupco Melovski
28. Dime Melovski
29. Ivana Lozanovska
30. Vasko Avukatov
31. Natalija Melovska
32. Daniela Jovanovska
33. Danka Uzunova